SOUTHERN POWER AND INDUSTRY

APRIL, 1955

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Stage Coal heat saves for Texas plant

MAINTENANCE 64
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Steam jets boosters in N.C. plant

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ALABAMA POWER COMPANY'S BARRY STEAM PLANT

Signals are electronic and air pressure is the power medium.

Initial capacity is 250,000 kw in two units. Coal fired boilers operate at 1875 psig and 1000 F. Exhaust from the high pressure turbine section is reheated to 1000 F and returned to the intermediate section.

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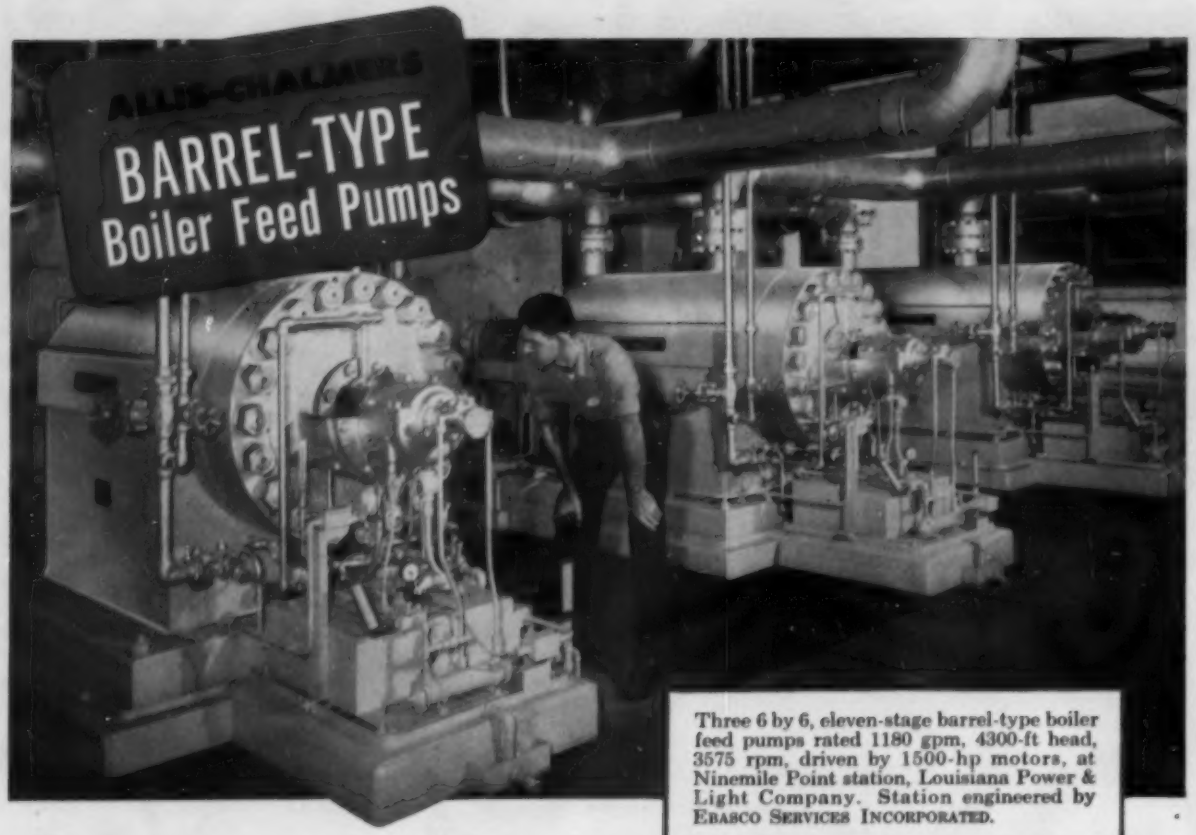

Three 6 by 6, eleven-stage barrel-type boiler feed pumps rated 1180 gpm, 4300-ft head, 3575 rpm, driven by 1500-hp motors, at Ninemile Point station, Louisiana Power & Light Company. Station engineered by EBASCO SERVICES INCORPORATED.

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Allis-Chalmers can supply the complete pumping unit — pump, motor and control — of coordinated design and manufacture. You get one responsibility — one guarantee of satisfaction.

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A-4635

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Volume 73 Number 4

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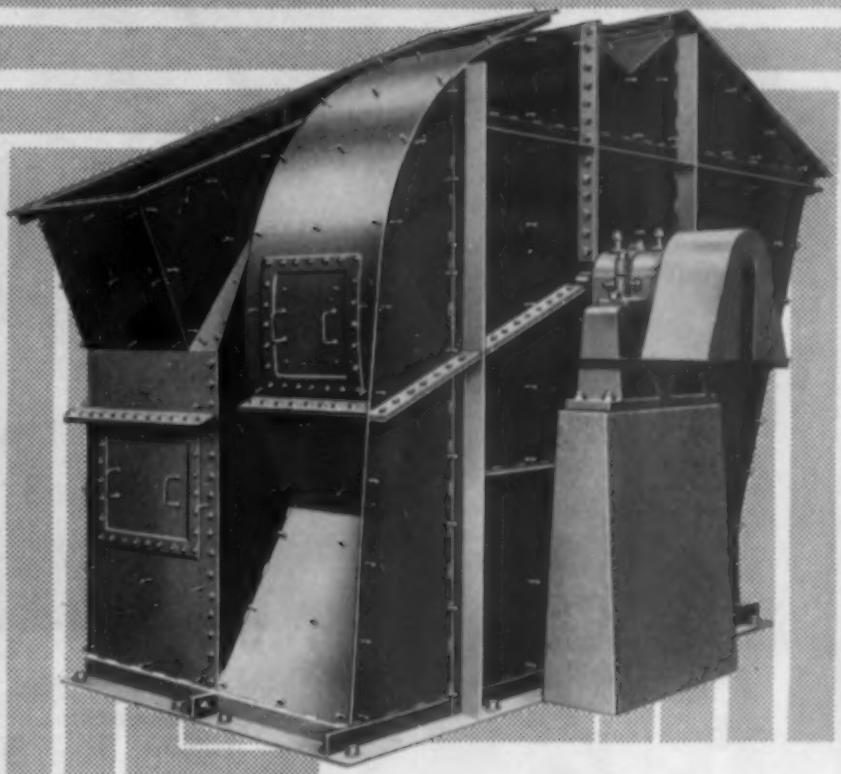

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SOUTHERN POWER AND INDUSTRY

APRIL 1955

Vol. 73 No. 4

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

April, 1955

► ALL-PURPOSE WELDING MACHINE by Lincoln Electric permits selection of a-c or d-c and either a soft or forceful arc. For a-c welding jobs the Idealarc machine provides a single phase transformer type welder; for d-c welding, machine provides d-c current through heavy duty rectifiers. Selection of either current is made through a twist of a switch handle.

Different output capacities of d-c and a-c can be combined to fit the welder to the job requirements. Machine can be quickly set for maximum efficiency on every type of welding; ferrous or non-ferrous materials, sheet metal or heavy plate, all positions, and under arc blow conditions or poor fit up.

► A MOVING RUBBER SIDEWALK, capable of handling 15,000 people an hour and featuring the widest conveyor belt ever used commercially to transport humans, is operating in the recently expanded Houston, Texas, Coliseum. The 82-in. wide moving sidewalk carries people across a pedestrian bridge that links a huge parking area with the Coliseum's exposition auditorium.

In its 114 ft course, sidewalk rises 12 ft to deliver passengers to the exposition hall. Belt measures 230 ft in length, is seven-eighths of an inch thick, with seven plies of fabric for interior reinforcement. A specially compounded rubber cover provides a scuff-resistant, easy-to-clean surface. Design and installation of the moving rubber sidewalk was a joint engineering project of Link-Belt Company, The B. F. Goodrich Company, and Otis Elevator.

► PRINTED CIRCUITS are featured in General Electric's new electronic adjustable-speed drives. The panels are actually current-carrying diagrams, and can be visually inspected for circuit faults. Since the new control circuit uses only a single miniature-type control tube, as contrasted with three conventional sized tubes in previous models, maintenance on the equipment is greatly simplified.

► EXPLOSION EXTINGUISHER, designed by Electronic Corporation of America to prevent fuel tank explosions on planes after direct hits in combat, is finding application in industries dealing with highly combustible materials.

Coupled with the cell inside the fuel tank of the plane is an explosive capsule containing a liquid extinguishing agent similar to carbon tetrachloride. When a bullet makes a hit on the tank, resulting in an explosion, the cell responds to the infrared radiation of the incipient explosion by counter-exploding the frangible capsule to flood the fuel tank vapor space with extinguishing liquid.

This successfully extinguishes explosions with little or no pressure rise instead of the several hundred pounds of pressure normally resulting from an unsuppressed explosion. In a few millionths of a second after the direct hit the explosion is extinguished before it ever really starts. Device is being adapted for use in ground fuel storage tanks, pumping stations, and similar areas, where explosions are an ever present hazard.

(Continued on page 6)

CONTACTORS

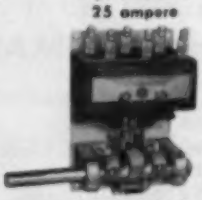
A-C & D-C • Sizes 00 to 7 • Ratings 10 to 900 Amperes

2 pole—Size 1
25 ampere

3 pole—Size 1
25 ampere

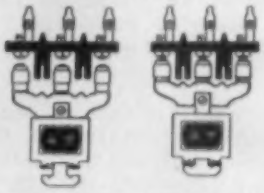
4 pole—Size 1
25 ampere

5 pole—Size 1
25 ampere



3 pole—Size 2
50 ampere cam-operated contactor

ALL SOLENOID OPERATED

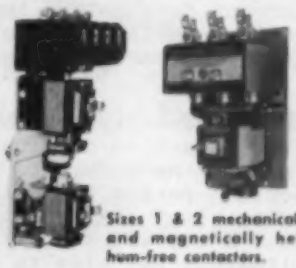


Contacts Open Contacts Closed

Here is the only complete line of solenoid contactors on the market . . . We have nine sizes from the little Size 00 (10 amperes) to the big Size 7 (900 amperes).

What does this mean to you? It means that all of your contactor requirements . . . from the smallest to the largest . . . can be met with Allen-Bradley trouble free solenoid controls. There is no contact maintenance . . . no pins, pivots, or bearings to stick and give trouble. Just one moving part—the simple solenoid plunger. Operating characteristics are consistent throughout all nine sizes.

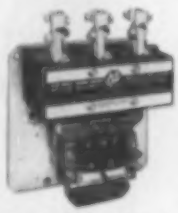
Enclosures are available, too, for general purpose watertight, dust-tight, and explosion-proof service. Allen-Bradley controls are a sales asset to any electrical device. May we send you our latest catalog?



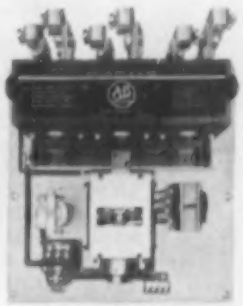
Sizes 1 & 2 mechanically and magnetically held hum-free contactors.

2 pole—Size 2
50 ampere

3 pole—Size 2
50 ampere



3 pole—Sizes 4 & 5
150 & 300 ampere
contactors



3 pole—Sizes 6 & 7
600 & 900 ampere contactors

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TULSA—John W. Elder Co., 1526 East Fourth St., Tel. 3-9149

Facts and trends (*continued from page 4*)

► ALUMINUM COATED FABRIC by Minnesota Mining and Manufacturing Co., is being used in protective garments for industrial "hot jobs." A thin aluminum coating is applied on a light asbestos fabric base, to protect the wearer by reflecting radiant heat instead of insulating against it.

► SYNTHETIC FIBER PAPER has been successfully produced for the first time by the Du Pont Company. It is three to ten times stronger than paper made from conventional pulp or rags. Du Pont is not manufacturing the paper but is making the details of the work available to the paper industry.

The new paper, made from nylon fiber, Dacron polyester fiber and Orlon acrylic fiber is highly resistant to chemical attack, absorbs very little moisture, and resists the action of molds, bacteria and light. The resistance to chemical attack would be useful in filtration of corrosive liquids and packaging of chemicals.

► STAIR CLIMBING CART, designed by Valley Craft Products, Inc., is equipped with a special ratchet mechanism which enables it to roll up stairs step by step as the operator pulls a cable drive. Two-wheel safety brakes prevent accidents when descending ramps or stairs with heavy loads.

► "DRY FLUID" DRIVE, using spherical steel shot as the flow charge, is a new development in industrial power transmission. The Dodge Mfg. Flexidyne does not slip at normal operating speeds. However, in the case of an overload, slippage provides protection. Settings can be adjusted to slip at anywhere 20% over full load torque to peak motor torque.

Drive consists of a housing, inside of which a rotor turns concentrically. Spherical steel shot (flow charge), acting like a fluid, transmits power from the housing to the rotor. Amount of charge determines torque capacity.

In addition to low first cost, low maintenance and top efficiency, the new drive permits use of smaller, cheaper motors and controls, with greatly reduced current demands and improved power factor. Smoother starts and gentler overload protection avoid breakage and reduce maintenance on drives, gears, bearings and driven machinery.

► COSTLY WASTE WATER PROGRAMS can sometimes be made to pay off in improvements to product quality, reduction of direct and indirect water costs, improvement of process methods, and reduction of water consumption. Hall Laboratories' recent bulletin "Waste Water" cites a large tissue manufacturing plant that was polluting a river with white water-borne wastes. A way was found for the plant not only to comply with state requirements but also to realize large "bonus benefits" through 95% recovery of re-usable fibers and more effective use, recovery, and re-use of water.

Hall Laboratories emphasizes that an economical waste water program does more than merely measure waste volume, determine objectionable components, and dump in suitable material to destroy or neutralize them. An ideal program starts at the point of origin and follows through all the processes from which water-borne wastes originate. Only after efforts to forestall, minimize or recover wastes are exhausted should treatment of waste water be considered.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

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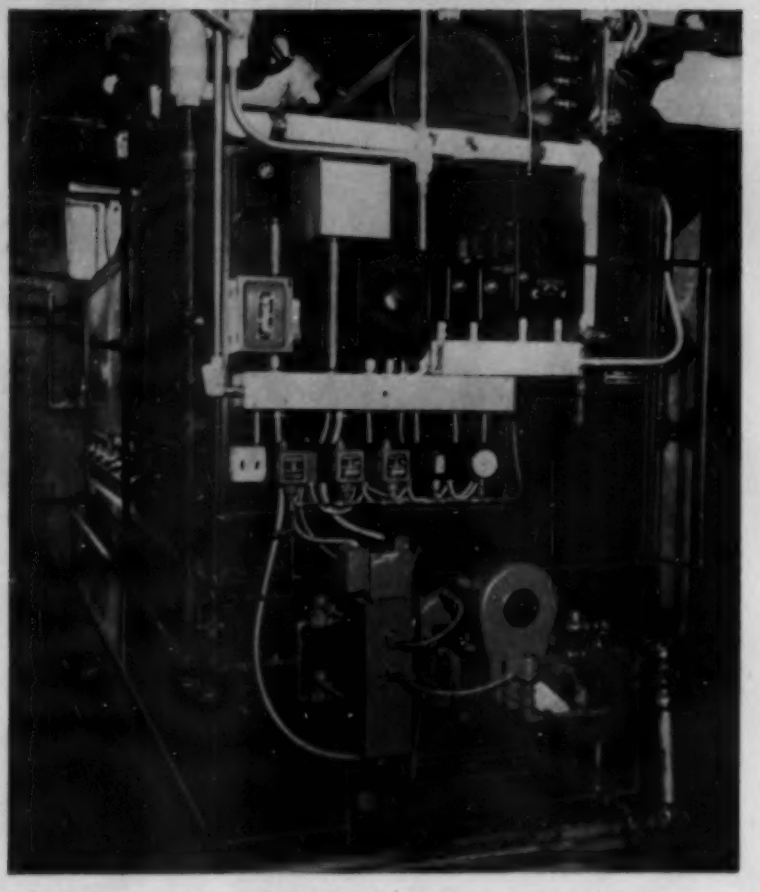

Photo shows typical installation of a 100 hp QC Boiler

Capacity of 100 hp QC Boiler

Minimum Safety Valve Capacity (ASME Code)

6578 lbs. steam per hour

QC Boiler Delivered Steam, continuous operation

4313 lbs. steam per hr.

QC Boiler Horsepower Rating (100 hp)

3450 lbs./steam/hr.

Have more steam readily available . . . fast . . . for extra loads when needed or for increased production facilities!

The large reserve capacity of QC Boilers gives you this advantage PLUS normal continuous operation at maximum efficiency.

Your steam capacity stays UP . . . your cost stays DOWN . . . all the time!

QC "bent tube" water tube boilers cost less to operate and require less maintenance. Side panels are easily removable for cleaning and for boiler inspections. Coal, gas or oil-fired . . . from 7½ to 400 hp.

For *more* steam, *faster* steam and *drier* steam at less cost, install a QC Boiler in your plant!

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NEWS *for the South and Southwest*

Erie City Iron Works Names Simonds Co.—Fla.

ERIE CITY IRON WORKS, Erie, Pa., announces the appointment of GEORGE L. SIMONDS COMPANY, WINTER HAVEN, FLORIDA, as district sales agents for the State of Florida.

George L. Simonds Company also operates a district office at PENSACOLA, FLORIDA, managed by R. A. MCMILLAN, who was formerly sales engineer for the Plibrico Company of Chicago.

With the representation of Erie City Iron Works, George L. Simonds Company is equipped to furnish all equipment, material and skilled labor for the installation of complete steam generator plants.

James Ragland & Douglass Lindsay

Fairbanks Co.—Ga. & Va.

James L. Ragland, manager of the Southern Area Branch Office and Warehouse of THE FAIRBANKS COMPANY in Rome, Georgia announces the transfer of Mr. Charles W. Freeman to the Georgia territory from the Virginia territory.

Mr. Douglass Lindsay replaces Mr. Freeman in the Virginia territory. In their new assignments Mr. Freeman and Mr. Lindsay will sell the complete Fairbanks line—casters and wheels, two-wheel and platform hand trucks, bronze and iron body valves and the Dart Union and Union Fittings—which will be serviced from the Rome, Georgia, Factory and Warehouse.

Bulkley, Dunton—Fla.

BULKLEY, DUNTON PROCESSES, INC., of New York has announced the appointment of J. L. MIDDLETON CO., MIAMI, FLORIDA, to handle its complete line of equipment in Southern Florida.

Bob Rier of **Memphis**, **S. D. Bowles** of **Dallas**, and **Ken Adams** of **Atlanta**, were three of the five Southern and Southwestern **Geo. D. Roper Corporation** Pump Division District Sales Managers in attendance.

Roper Pump Division Holds Sales Clinic; Appoints New Southeastern District Mgr.

The GEO. D. ROPER CORPORATION PUMP DIVISION recently held a special day-and-a-half sales clinic for their District Sales Managers at Rockford, Illinois. Emphasis was given to the sales features and application possibilities on the new Roper low speed, high torque hydraulic pump-motors and a new L-P gas truck pump.

Southern and southwestern district sales managers participating in the program included: H. KENNETH ADAMS, JR., ATLANTA; S. D. BOWLES, DALLAS; K. W. CONNOR, KANSAS CITY; G. J. NEUMAYER, SR., ST. LOUIS, and R. J. RIER, MEMPHIS.

H. KENNETH ADAMS, 950 Cardova Drive, N.E., ATLANTA, GEORGIA, was recently appointed as the company's southeastern district sales manager. His territory for the Roper industrial and petroleum handling pumps will be the states of GEORGIA, FLORIDA, ALABAMA, NORTH CAROLINA and SOUTH CAROLINA.

Mr. Adams has had extensive practical engineering experience since 1941, when he graduated from Mercer University at Macon, Georgia. During World War II he was employed by the Air Materiel Command and Bell Aircraft Corporation in strategic engineering work.

In 1945 he joined the Coca Cola Company at Atlanta, Georgia, as plant design engineer and assistant to Chief Engineer. During this time, his duties included design of new syrup manufacturing plants and operating equipment and he was responsible for the first successful bulk transportation and delivery of Coca Cola syrup by tank trailer.

From 1951 to 1954, Mr. Adams represented the Yale and Towne Manufacturing Company as Southern District Manager for their pump division.

In March 1954, Mr. Adams was appointed Southern Sales Representative for the Oil Equipment Division of A. Y. McDonald Company of Dubuque, Iowa, calling on major customers throughout eight southeastern states and continues to represent this company.

POWELL VALVES ... THE COMPLETE QUALITY LINE ... POWELL VALVES

FIG. 3031 WE—Steel O.S. & Y. Globe Valve For 300 Pounds W.S.P.

FIG. 11303—1500-Pound Pressure Seal Steel Gate Valve.

FIG. 1331-A—1500-Pound Steel Integral Bonnet Offset Globe Valve.

FIG. 3059-G—300-Pound Steel Lubricated Plug Valve. Gear Operated.

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. . . *because they know Powell Valves are dependable and economical.* Power engineers also know that Powell has *the COMPLETE quality line of valves.*

Investigate the many outstanding features of the Powell Valves shown here . . . as well as *the complete line* of quality valves that have a proven record of long life and dependable service.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our complete line, and help solve any flow control problem you may have.

The Wm. Powell Company, Cincinnati 22, Ohio ..... 109th year

POWELL VALVES

News for the South and Southwest (continued)

Allis-Chalmers—Kentucky

THE NATIONAL ELECTRIC SERVICE CORPORATION, HARLAN, KENTUCKY, has been named a distributor for ALLIS-CHALMERS motors and a certified service shop for Allis-Chalmers motors, control and transformers in portions of TENNESSEE, NORTH CAROLINA, KENTUCKY, and VIRGINIA.

J. W. OVERSTREET is president and general manager of the National Electric Service Corporation, which was established in Harlan in 1951 as a subsidiary of the National Electric Coil Corporation, Columbus, Ohio.

Cotham Represents Sterling Electric Motors—Houston

CHARLES E. COTHAM, JR. has been appointed District Manager of STERLING ELECTRIC MOTORS, INC., for the HOUSTON, TEXAS territory.

Charles E. Cotham, Jr.

Mr. Cotham has had experience in electrical maintenance and construction work in the Baton Rouge area and staff engineering at Alcoa's Rockdale plant. He is an electrical engineering graduate of the University of Houston.

The Houston office is located at 1107 Dowling Street.

FUTURE EVENTS
Of Engineering Interest

AMERICAN POWER CONFERENCE, R. A. Budenholzer, Director, Illinois Institute of Technology, Technology Center, Chicago 16, Ill.
Mar. 30-Apr. 1, Seventeenth Annual Meeting, Sherman Hotel, Chicago, Ill.

NATURAL GASOLINE ASSOCIATION OF AMERICA, Wm. F. Lowe, Sec'y-Treas., 423 Kennedy Bldg., Tulsa 3, Okla.
Apr. 13-15, 34th Annual Convention, Baker and Adolphus Hotels, Dallas, Texas.

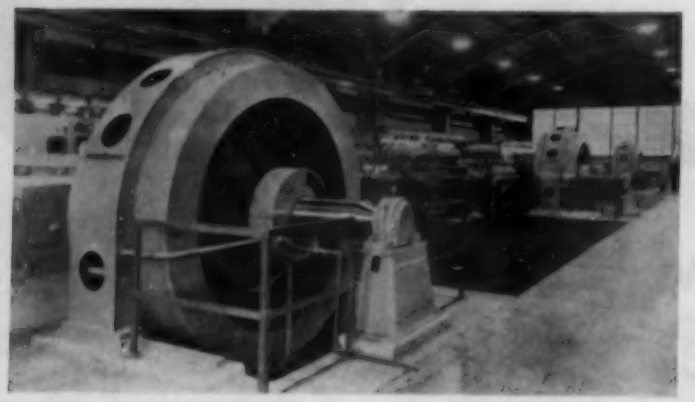
AMERICAN SOCIETY OF LUBRICATION ENGINEERS, W. F. Leonard, Sec'y, 343 S. Dearborn St., Chicago 4, Ill.
Apr. 13-15, Annual Meeting and Exhibit, Chicago, Ill.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. B. Davies, Sec'y, 29 West 39th St., New York, N. Y.
Apr. 18-21, Diamond Jubilee Spring Meeting, Lord Baltimore and Southern Hotels, Baltimore, Md.

NATIONAL MATERIALS HANDLING EXPOSITION, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
May 16-20, Exposition, International Amphitheatre, Chicago, Ill.

INDUSTRIAL MARKETING ASSOCIATES INC., John Paul Taylor, Exec. Sec'y, 520 Pleasant St., St. Joseph, Mich.
May 22-26, Annual Meeting, The Cloister, Sea Island, Georgia.

BASIC MATERIALS CONFERENCE AND EXPOSITION, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
May 31-June 3, Conference and Exposition, Philadelphia, Pa.



Close-up of a G-E 3000 hp, unity power factor, 4000 volt, 240 rpm, synchronous motor driving a compressor at the Grace Chemical Co. near Memphis, Tennessee.

Grace Chemical at Memphis Nearly "All-Electric"

More than 28,000 hp of General Electric motors will power equipment manufacturing ammonia and urea at a new $20 million dollar plant dedicated recently by the GRACE CHEMICAL CO., subsidiary of W. R. Grace & Co.

The new installation, located 10 miles north of Memphis at WOODSTOCK, TENNESSEE, depends almost entirely on electricity for its operation. Containing almost $1.5 million dollars in General Electric equipment, the plant is expected to have a 20,000 kw load.

Ninety per cent of the load will result from motors used in the manufacturing processes. A total of 21,000 hp alone is contained in six General Electric motors. Three are rated at 3,000-hp each, and three at 4,000-hp each.

In operation since late December, the plant is expected to reach or exceed rated capacity early in 1955, producing 250 tons of anhydrous ammonia and 150 tons of urea per day.

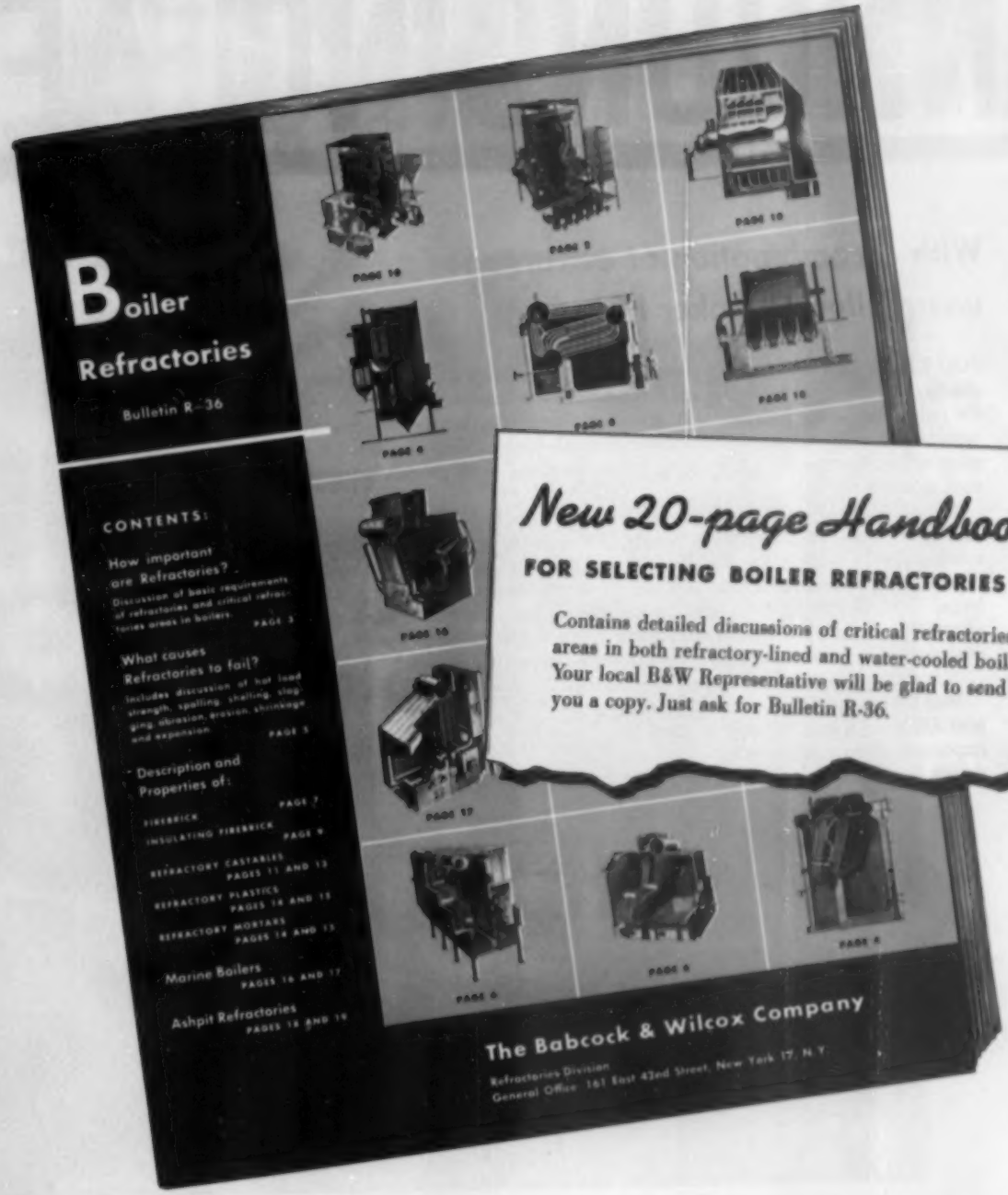
The six king-size G-E motors operate compressors which compress nitrogen, air, and methane used in the manufacture of ammonia. Three G-E 7,500-kva transformers step down incoming power from 12,500 to 4,160 volts for motor usage.

Because the motors are too large for conventional motor control equipment, metal-clad switchgear is used. The 85 ft lineup of G-E switchgear contains 38 cubicles, including 18 for motor-starting equipment. The remaining cubicles are used to start other 4,000-volt motors in the plant and for general purpose power supply.

Other equipment supplied by General Electric includes three 1,000-kva and one 750-kva load center unit substations, saturable reactors to regulate heat in the Casale Process for ammonia synthesis, two 250-hp induction generators, four motor control panels, ten rectifiers, five cubicles of 12.5-kv switchgear for incoming line from power company and for the plant's main distribution feeders, and numerous small motors.

According to General Electric engineers, the plant's power-distribution systems is one of the most modern in the chemical industry.

More News—Page 92


Boiler Refractories
Bulletin R-36
CONTENTS:
How important are Refractories?
Discussion of basic requirements of refractories and critical refractories areas in boilers. PAGE 3
What causes Refractories to fail?
Includes discussion of hot load strength, spalling, shelling, slagging, abrasion, erosion, shrinkage and expansion. PAGE 5
Description and Properties of:
FIREBRICK PAGE 7
INSULATING FIREBRICK PAGE 9
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REFRACTORY PLASTICS PAGES 14 AND 15
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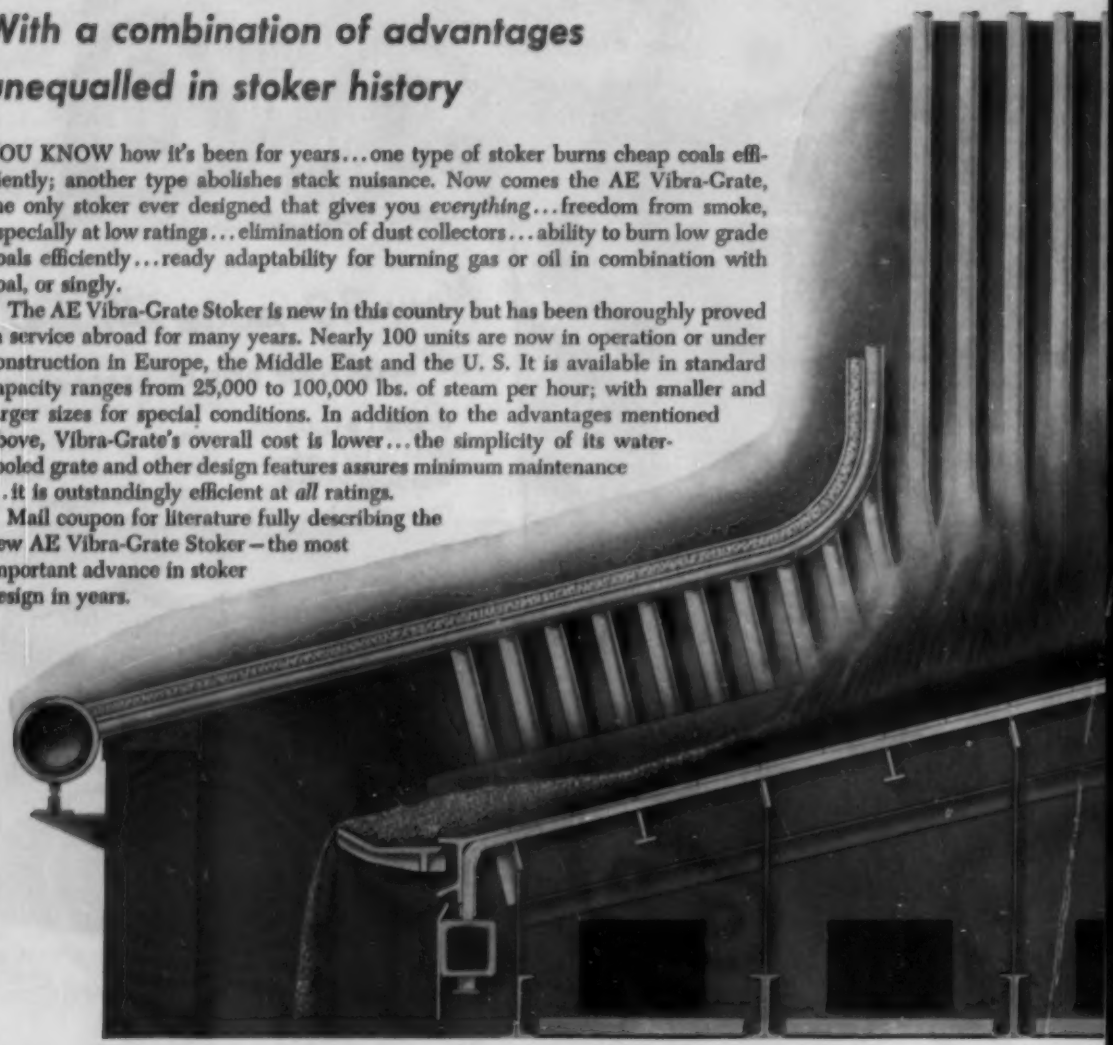

WATER TUBE SECTION –
showing mounting of grate blocks.

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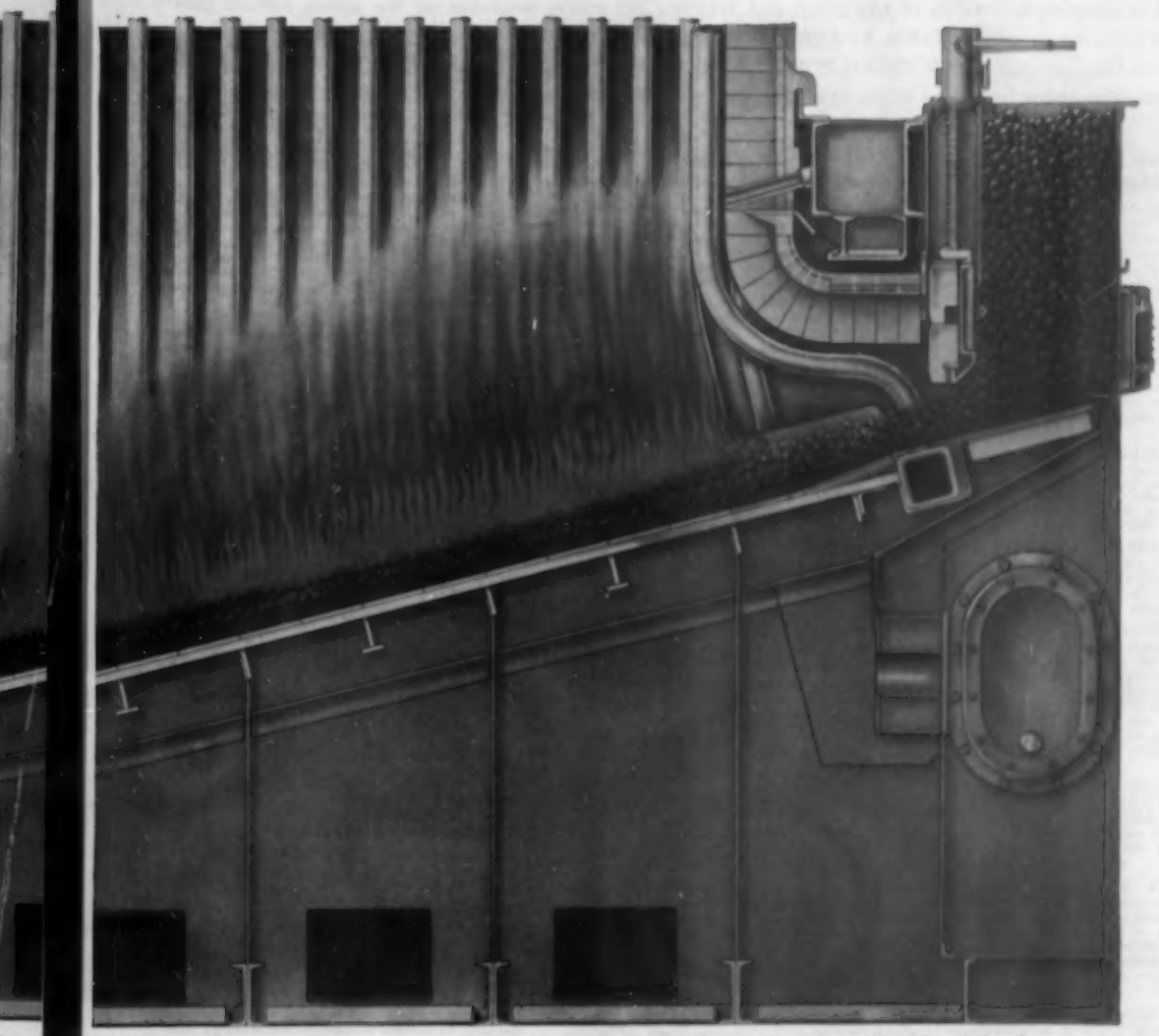

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ELECTRICAL

820 **MOTOR CONTROL UNITS**—Bulletin 800-T—Describes oil tight solenoid motor controlled units for machine tools and similar equipment with various accessory equipment to fit the particular job.—ALLEN-BRADLEY CO.

821 **ELECTRIC HEATING UNITS** — Catalog 50 — Illustrates and describes basic Chromolox electric heating elements. Sizes, ratings and uses are listed for strip, ring, cartridge and tubular types, as well as "packaged" units such as hot plates, circulation and unit heaters. — EDWIN L. WIEGAND CO.

838 **ELECTRIC POWER DRIVES** — Scale Drawings, 21 sheets—Illustrate and describe geared, electric power drives for design engineers, draftsmen and layout engineers. Three views are detailed on each sheet with the frame and type drawn to three separate scales, from ¼ hp to 30 hp capacity.—STERLING ELECTRIC MOTORS, INC.

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931 **VACUUM CLEANING**—Form A-713 pictures a wide variety of plant cleaning and production jobs, through illustration of typical plants, done by Hoffman vacuum cleaning equipment.—U. S. HOFFMAN MACHINERY CORP.

935 **METAL STAMPING FACILITIES**—Brochure No. 100—Describes shearing, blanking, drawing, forming, embossing, assembly and finishing equipment in Campco's modern Carolina plant which offers Southern industry convenient, modern facilities for metal stamping. Plant has 67 major units of equipment, including a 300 ton hydraulic press. From design through delivery, Campco converts your production ideas into finished metal products.—CAROLINA METAL PRODUCTS, INC.

956 **SWIMMING POOL EQUIPMENT**—Bulletin WC-109—Describes a complete line of swimming pool equipment, including filters, chemical feeders, sterilizers, hair and lint catchers, pool cleaners, recirculating pumps, heaters, fittings and accessories — dimension, capacity and other tables.—GRAVER WATER CONDITIONING COMPANY.

960 **UNIT HEATERS**—Thermolier Catalog—Describes the important features of Thermolier unit heating, an economical method of adequate plant heating.—GRINNELL CO., INC.

992 **FIRE PROTECTION**—Bulletin 2819 describes Blaw-Knox Deluge systems, wet and dry pipe sprinkler systems, water spray and fog systems, rate-of-rise sprinkler systems, etc., and indicates how a sprinkler system pays for itself out of insurance savings. — BLAW-KNOX SPRINKLER DIV., BLAW-KNOX CONSTRUCTION CO.

Continued on page 108

4-55-2

Please send me without obligation, free booklets described in the April, 1955, issue of SOUTHERN POWER AND INDUSTRY as circled below.

2	20	21	40	51	56	59	73	82	98	105	112	118	120	167	168	173
182	211	218	222	230	247	257	287	307	326	336	345	366	371	378	399	403
424	428	441	446	459	481	493	496	505	511	551	552	583	603	611	621	636
647	693	728	756	775	777	778	820	821	838	861	864	901	924	931	935	956
960	992	P-1	P-2	P-3	P-4	P-5	P-6	P-7	P-8	P-9	P-10	P-11	P-12	P-13	P-14	P-15
P-16	P-17	P-18														

Also send further information on following New Equipment (page 80)

D-1 D-2 D-3 D-4 D-5 D-6 D-7 D-8 D-9 D-10 D-11 D-12 D-15 D-16 D-17

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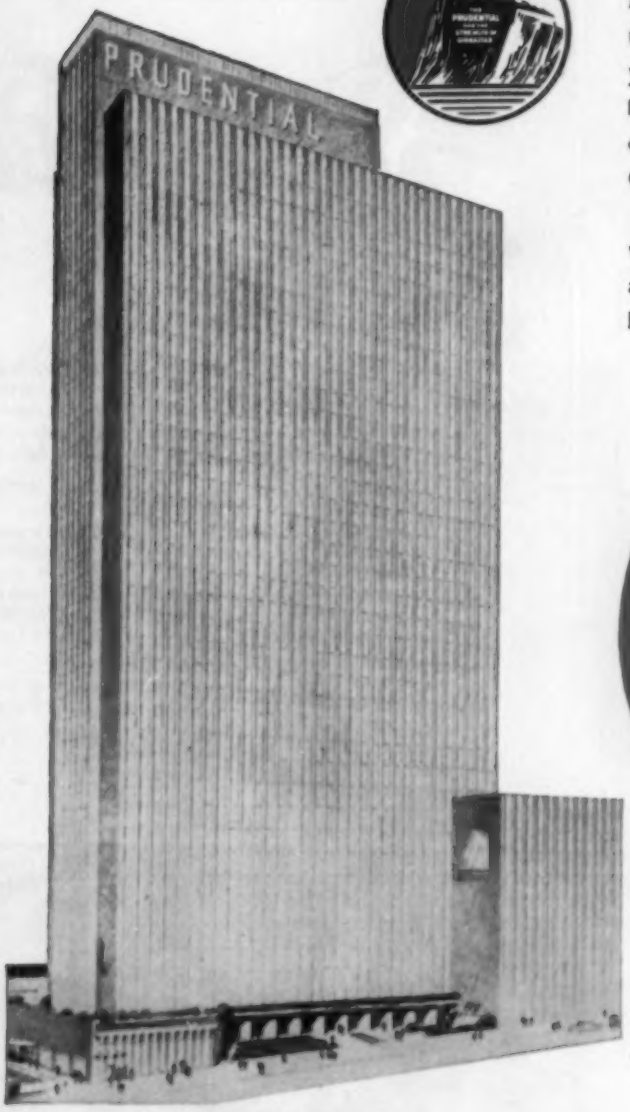
List Items You Want, Tear Out and Mail One of the Attached Cards Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

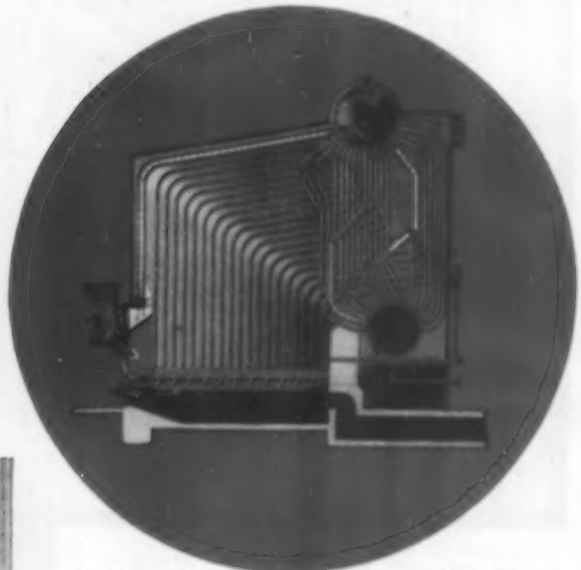
ERIE CITY *boilers used by* Prudential in CHICAGO



NAESS & MURPHY, Architects and Consulting Engineers
L. J. SHERIDAN & CO., Renting Agents

Modern, Erie City VC Steam Generators will satisfy the heating load for the most modern office building yet projected. The Prudential Building, soon to rise 600 feet into the Chicago skyline, is the very last word in office facilities. Prudential's new Mid-America Home Office is one of the largest office buildings in Chicago.

Erie City VC's, the last word in compact, completely water cooled steam generators will provide flexibility and economy of operation in meeting a variable steam heating load.



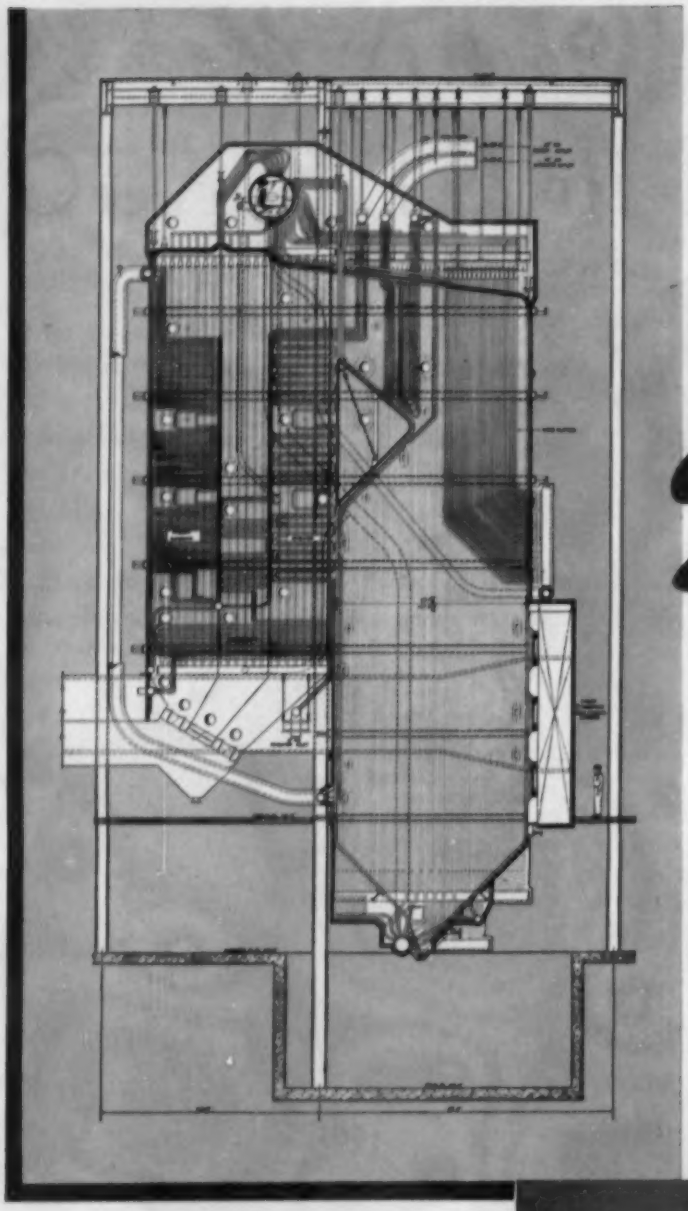
This multiple installation of three Erie City VC's, fired by Detroit spreader stokers, features completely water cooled furnaces—offers high capacity in a compact design. Erie City VC's save space, economize installation and maintenance costs. They permit a high degree of flexibility and quick response to load changes. Request Bulletin VC-4.

ERIE CITY
100 Years in Steam Generation

You can depend on Erie City for sound engineering

ERIE CITY IRON WORKS • *Erie, Pa.*

STEAM GENERATORS • SUPERHEATERS • ECONOMIZERS • AIR PREHEATERS
UNDERFEED AND SPREADER STOKERS • PULVERIZERS



600,000 lbs/hr will more than at Florida Power

Suwanee

Riley Reheat Unit for Suwannee River plant will feature superheat and reheat steam temperature control without use of spray. Unit is designed to burn low grade oil, natural gas, with provisions for burning pulverized coal in future.

Feed Water Temp.	457 F.
Capacity	600,000 lbs/stm/hr
Superheat Pressure	1550 psig
Superheat Temperature	1000 F.
Reheat Pressure	450 psig
Reheat Temperature	1000 F.
Furnace Width	27′-3 15/16″
Furnace Depth	22′-7 5/8″
Heat Release in Furnace (oil)	
Btu per cu. ft. per hr.	22,800
Btu per sq. ft. per hr.	95,000

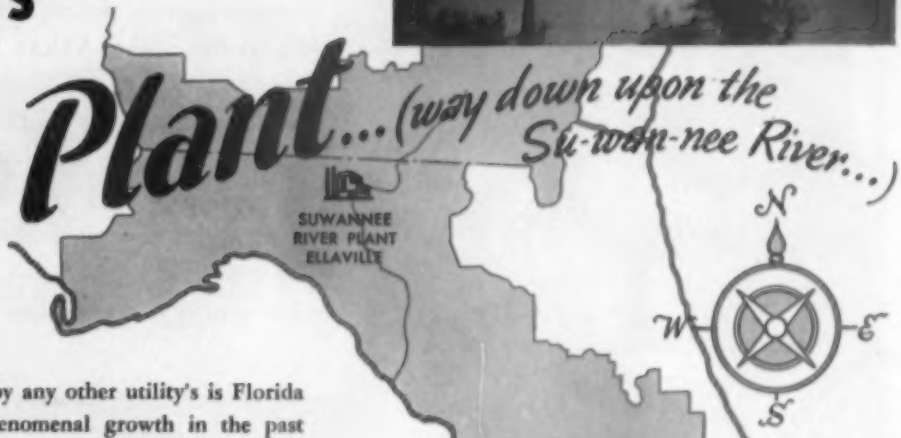
Black and Veatch
Consulting Engineers

The Riley Unit, the largest of the three units at the Suwannee River Plant will more than double the kilowatt output. Construction will start soon and is scheduled for completion by end of 1956.

RILEY DESIGNS, MANUFACTURES AND INSTALLS COMPLETE STEAM GENERATING UNITS AND

RILEY Reheat Unit double Kw output Corporation's

River Plant... (way down upon the Su-wan-nee River...)



Almost unmatched by any other utility's is Florida Power Corporation's phenomenal growth in the past ten years . . . and no wonder . . . look at the remarkable growth area it serves . . . thirty-one thriving Florida counties, and nineteen South Georgia counties through its wholly-owned subsidiary Georgia Power and Light Company! Riley Stoker Corporation shares in this growth with a 600,000 lb/hr reheat steam generating unit, that, when installed, will bring Florida Power's net system generating capability to 600,000 kilowatts . . . a far cry from the mere 87,500 kilowatts that the company produced as recently as 1944.

Florida Power Corporation is one of many important public utilities that in recent years have ordered Riley Reheat Units . . .

Utah Power & Light Company
Gadsby Station
1-575,000 lbs/hr; 1700 psig; 1000/1000F.

Louisiana Power & Light Company
Nine Mile Point Station
1-1,000,000 lbs/hr; 1725 psig; 1005/1005F.

City of Los Angeles, Dept. of Water & Power, Valley Steam Plant
2-1,200,000 lbs/hr; 2075 psig; 1000/1000F.

Houston Lighting & Power Company
Deepwater Station
1-1,200,000 lbs/hr; 2125 psig; 1005/1005F.

Houston Lighting & Power Company
Sam Bertron Steam-Electric Station
1-1,200,000 lbs/hr; 2125 psig; 1005/1005F.

Texas Electric Service Co.
Fort Worth
1-1,250,000 lbs/hr; 2125 psig; 1005/1005F.

Public Service Co. of Indiana, Inc.
Wabash River Station
1-805,000 lbs/hr; 2075 psig; 1005/1005F.

Central Louisiana Electric Company, Inc.
Teche Station
1-350,000 lbs/hr; 1050 psig; 1005/1005F.

Public Service Co. of Indiana, Inc.
New Albany Station
2-1,000,000 lbs/hr; 2075 psig; 1005/1005F.

Dairyland Power Cooperative
Alma, Wisconsin
1-390,000 lbs/hr; 1650 psig; 1005/1005F.

A survey of your plant by a consulting engineer could show ways of making surprising savings in your power costs.

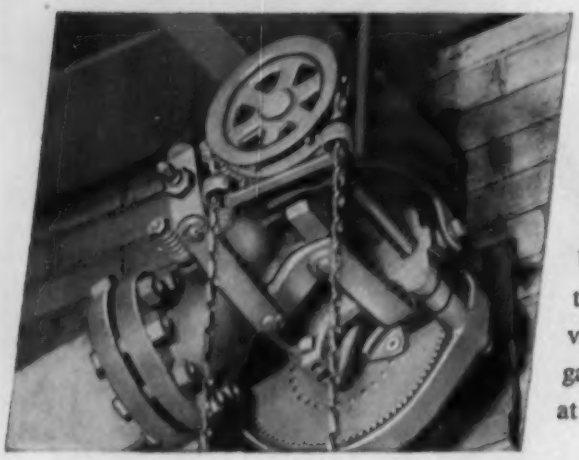
RILEY
Stoker Corporation
WORCESTER, MASSACHUSETTS

Boston, New York, Philadelphia, Buffalo, Washington, Pittsburgh, Cleveland, Detroit, Chicago, Cincinnati, Charlotte, New Orleans, Atlanta, St. Louis, Kansas City, St. Paul, Tulsa, Houston, Denver, Salt Lake City, Los Angeles, San Francisco, Portland, Seattle.

FUEL BURNING EQUIPMENT FOR PUBLIC UTILITY AND INDUSTRIAL POWER AND HEATING PLANTS

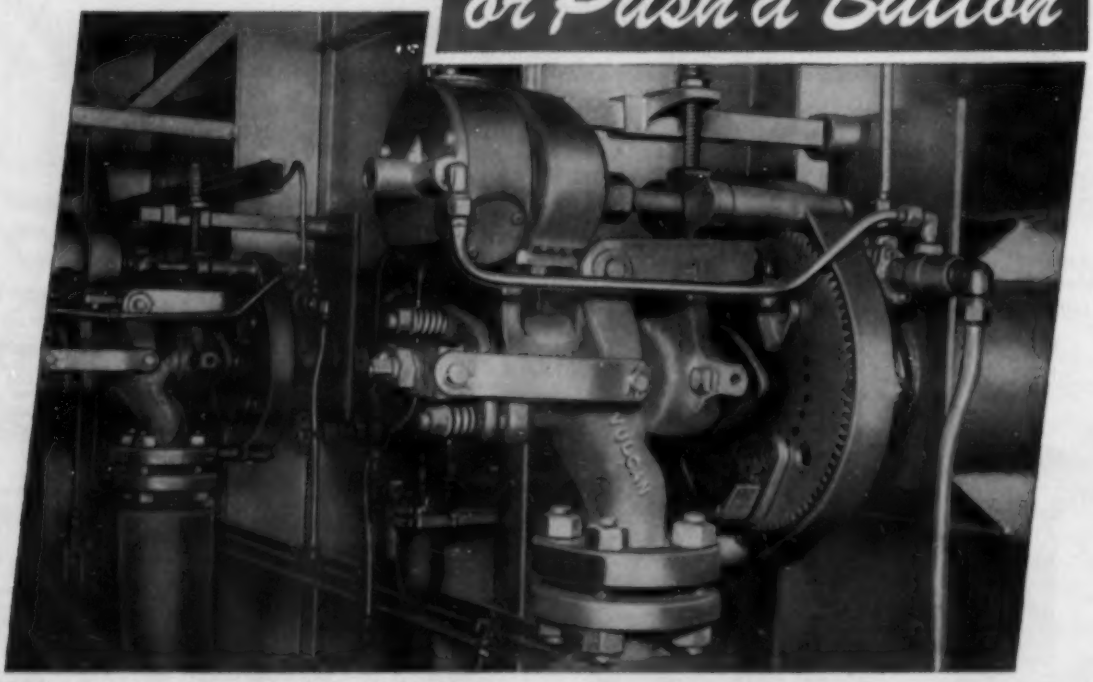
Pull a Chain

for full 360° boiler cleaning



Hand-operated or motor-driven—every Vulcan Rotary Soot Blower gives exactly the same 360-degree cleaning action. In fact, you can change a manually-operated Vulcan Rotary to an automatic unit by merely replacing the sheave wheel with an air or electric motor, and adding a control block. Uniform blowing pressure—from start to finish of the cycle—is assured by an exclusive trigger-action valve. And this valve seals off corrosive furnace gases from internal parts. For better boiler cleaning at low cost, depend on Vulcan.

or Push a Button



COPES-VULCAN DIVISION, *Continental Foundry & Machine Company,* ***ERIE 4, PA.***

VULCAN Rotary SOOT BLOWERS

GULFCREST *is the only turbine oil that is super refined for superior performance by the ALCHLOR PROCESS*

Barrel No. 1 contains a highly refined oil that will become Gulfcrest. It has gone through the usual steps used in refining other turbine oils—but has not yet been Alchlor Processed.

Barrel No. 2 contains the part —approximately 15%—discarded by the Alchlor Process. This discarded portion contains unstable hydrocarbons which, if allowed to remain in a turbine oil, are likely to oxidize, increase neutralization number, form sludge, emulsifiers, and harmful acids.

Barrel No. 3 contains Alchlor Processed Gulfcrest—the incomparably pure lubricant that lasts longer, gives superior performance and helps keep your turbine systems clean indefinitely. To make Gulfcrest even finer, special inhibitors are added to give it still greater stability and protect against corrosion and foaming.

Call your nearest Gulf office today and have a Gulf Sales Engineer recommend the proper grade of Gulfcrest Oil to meet the specific requirements of your turbines.

GULF

GULF OIL CORPORATION • GULF REFINING COMPANY • 1822 Gulf Building, Pittsburgh 30, Pa.

Welded-In Tubes in High Pressure Service... 7 years without a failure

One of the greatest problems in operating high pressure feedwater heaters in modern super-pressure power plants is failure of expanded tube joints. In 1947, Lummus pioneered the field in *welding* monel tubes to steel tube sheets in feedwater heaters. Two such units were built for the city of Lansing, Michigan, designed for 1200 psi. These units have had no failures in seven years of operation.

Lummus now has developed a procedure of welding copper nickel tubes to steel tube sheets. Subjected to terrific pressure and temperature tests, the welded units have gone through many cycles with excellent results. Lummus has also made one installation, in service now for over six months without a failure, having a design pressure of 2900 psi, and requiring over 30,000 70-30 cupro nickel tubes welded into steel tube sheets.

The unit shown above, with a design pressure of 2,600 psi, is being fitted with 70-30 cupro nickel tubes. Successful installations have also been made with 80-20 cupro nickel tubes.

Welding-in of tubes eliminates the possibility of tube joint failure because of fabricating inaccuracies, tube irregularities, nickel oxide deposits from annealing operations, and excessive tube hardness. Welding-in makes possible the use of heavy wall tubes which cannot be satisfactorily expanded.

Your inquiries are invited.

THE LUMMUS COMPANY, Heat Exchanger Division: 385 Madison Avenue, New York 17, N. Y.
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Steam Surface Condensers • Evaporators • Extraction Bleeder Heaters • Steam Jet Air Ejectors • Steam Jet Refrigeration • Barometric Condensers • Heat Exchangers for Process and Industrial Use • Process Condensers • Pipe Line Coolers.

LUMMUS

THE LUMMUS COMPANY HEAT EXCHANGER DIVISION, 385 MADISON AVE., NEW YORK 17, N. Y.

. . . One leading public utility has a 4,500 psi, 1,150F double reheat cycle unit under construction. Another nounced plans for a new su[per]critical pressure, steam electric st[a]tion. The single-boiler-turbine-gene[rator] unit for this new station will oper[ate] at a higher steam temperature [and] pressure, and will have a capab[ility] greater than any installation thus [far] announced. Using supercritical pr[essu]re, and employing two stages of [reh]eat, the new unit should be the mos[t] efficient plant thus far projected by [the] central station industry. The 6[,000]-psi steam generator will supp[ly] steam to the turbine at 5,000 psi [and] 1,200F. . . .

AS POWER PIPING BECOMES MORE CRITICAL

M. W. KELLOGG TESTING TECHNIQUES KEEP PACE

To meet the demand for more electric power, and to increase output with the least possible increase in fuel, the trend in utility steam power plants, as reported everywhere, is to higher temperatures and pressures. Thus steam piping—main and reheat—becomes even more critical than before.

One way in which The M. W. Kellogg Company, leading fabricator of power piping, keeps pace with increases in temperature, pressure, and capacity demands is in its testing techniques. Most recent Kellogg development is the company's "atomic camera". Activated by isotopes such as cobalt, iridium, and cesium, this powerful and portable device can photograph welded seams up to six inches thick in a single, short exposure. The same test by traditional X-ray equipment would take considerably longer.

The M. W. Kellogg Company was among the first to be permitted by the AEC to use isotopes of this magnitude. The atomic camera has already proved its value in the construction of many important public utility jobs. It is indicative of the Kellogg research and engineering which guard the vital link between steam power plant boilers and turbines.

M. W. KELLOGG'S "ATOMIC CAMERA"

FABRICATED PRODUCTS DIVISION
THE M. W. KELLOGG COMPANY, 225 BROADWAY, NEW YORK 7, N. Y.
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POWER PIPING—THE VITAL LINK

BELL & ZOLLER COALS . . .

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If you want the finest coals in America at the lowest possible cost, phone your nearest Bell & Zoller office! Whatever your needs, there is a Bell & Zoller coal *just right* for your burning equipment and power-producing requirements. Our modern mining and preparation methods, plus combined rail-and-water shipping facilities, mean better service and more economy for you. We're ready to serve you anytime, anywhere!

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Sales Agents for:
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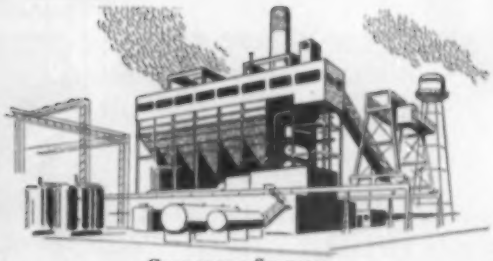
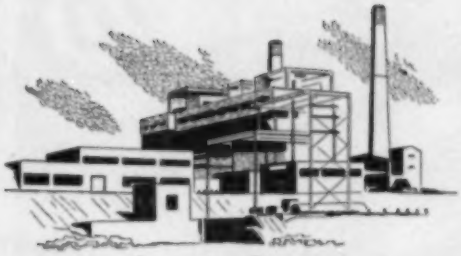
Producers of **ZEIGLER, MOSS HILL, ORIOLE, MURDOCK and BUCKHORN Coals**



GOLDSBORO STATION
Total capability 169,000 kw.



LUMBERTON STATION
Total capability 185,000 kw.

WILMINGTON STATION
Total capability 230,000 kw. (est.)

Grinnell piping products have played a vital role in the construction of

7 NEW UNITS IN 7 YEARS

for Carolina Power & Light Company

HERE IS THE RECORD!
(Completion dates)
1949 . . . Lumberton Station, Unit #1
1950 . . . Lumberton Station, Unit #2
1951 . . . Goldsboro Station, Unit #2
1952 . . . Goldsboro Station, Unit #1
1952 . . . Lumberton Station, Unit #3
1954 . . . Wilmington Station, Unit #1
(Scheduled completion date)
1955 . . . Wilmington Station, Unit #2

Main steam line in WILMINGTON plant, fabricated by Grinnell, and supported by Grinnell Model R Constant-Support Hangers.

Since 1949, Carolina Power & Light's modernization and improvement program has been in full swing. Over this 6-year period, 6 new steam-electric generating units have been added to the system, with another scheduled for completion early in 1955. And very significantly, in each of these seven new units, Grinnell Prefabricated Piping and Grinnell Engineered Hangers have been employed, *exclusively!*

This continuous use of Grinnell Piping Products over the years means that Grinnell has successfully passed the most exacting test of all . . . the "test" of actual performance . . . on the job . . . day-in and day-out.

Piping fabricated in Grinnell shops is done under ideal conditions, with modern equipment, by personnel qualified for each class of work. Included in the price (which is determined in advance) are such items of expense as: interpretive engineering, shop sketches and planning, procurement of materials, power services, expendable tools and supplies. There are no charges for waste material or spoilage. All piping is rigidly inspected and tested to comply exactly with customer specifications and applicable codes. Consult Grinnell on your next piping job.

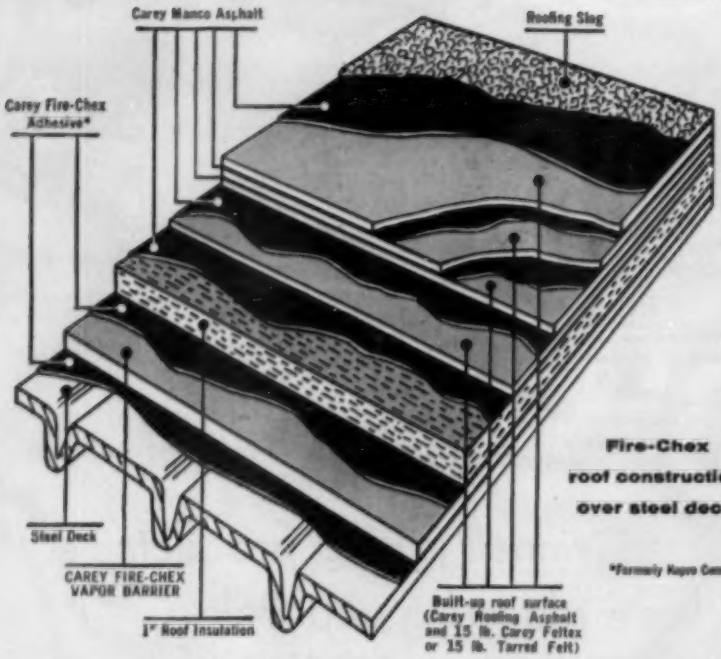
GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

Removes all doubt about the fire-safety of built-up roofing!


Carey Manco Asphalt
Roofing Slag
Carey Fire-Chex Adhesive*
Steel Deck
CAREY FIRE-CHEX VAPOR BARRIER
1" Roof Insulation
Built-up roof surface (Carey Roofing Asphalt and 15 lb. Carey Feltex or 15 lb. Tarred Felt)

Fire-Chex roof construction over steel deck

*Formerly Kopro Cement

Carey Fire-Chex Asbestos-Plastic Vapor Barrier

Application is Easy—
Simply apply Carey Fire-Chex Adhesive* with brush or spray over entire deck. When adhesive becomes tacky . . .

Apply a full 36" wide sheet of Fire-Chex Vapor Barrier, sanded side to deck. Allow 3" side lap, 6" end lap.

Seal both ends securely with Fire-Chex Adhesive. Continue application, lapping each sheet 3". Now apply insulation and built-up roofing.

In Carey FIRE-CHEX, you have a vapor barrier that *does not contribute to fire and cause it to spread!* Even when installed over a standard steel deck that becomes red-hot in a fire, FIRE-CHEX remains intact—*does not release melting asphalt and excessive gases!* Product of over a million dollars invested in development, tests *prove* FIRE-CHEX removes all doubt about fire-safety in built-up roofing.

Why take chances with ordinary, hazardous vapor barriers that have been responsible for multi-million-dollar industrial plant fires? FIRE-CHEX assures you priceless protection for your buildings—*and is available for just a few cents more per square* than the conventional type.

Write today for a sample of this Carey dependable product, and for your copy of the FIRE-CHEX Specification Sheet. Or, request a Carey Industrial Sales Engineer to call. Address Department SPI-4.

Serving Industry, Farm and Home Since 1873

Carey

Asbestos-Plastic
Fire-Chex Vapor Barrier
...does not contribute to fire!

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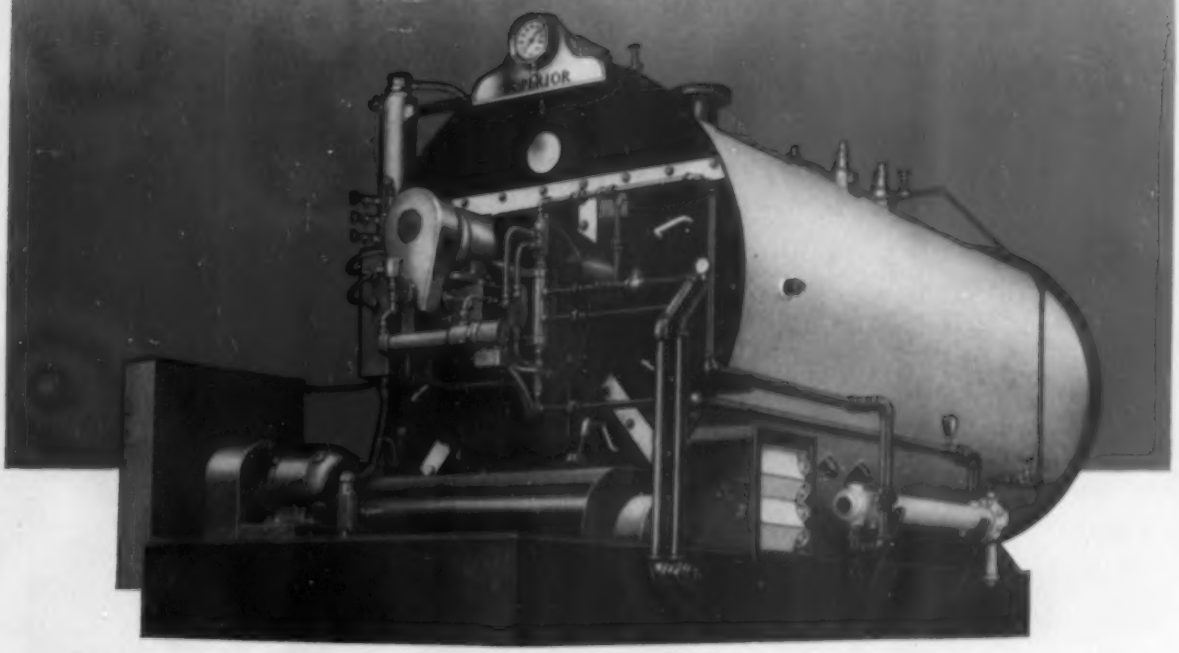
Built-up Roofs • Asbestos and Asphalt Saturated Felts • Roof Coatings and Cements • Fiber-Flex Glass Roof System
Careystone Corrugated Asbestos-cement Roofing & Siding • Thermal Insulations

STAMINA



for YEARS of low cost steam

Get the complete story. Write for Catalog 711 describing 18 sizes from 20 to 600 b.h.p; pressure to 250 p.s.i. burning oil or gas or both.

Boilers, too, grow old . . . and when the honeymoon of the first year or two is over, dirt, scale, and wear on moving parts start to take their toll in loss of efficiency. That's why Superior Steam Generators are built bigger, heavier, and more rugged, with four-pass construction and full 5 sq. feet of heating surface per boiler horsepower, measured on the smaller I.D. of the tubes. The relatively slow speed full bank induced draft fans, the larger triple-blow-down water column, and the rigid channel iron base are other typical features of design which add the stamina that makes efficient low cost steaming a reality . . . not for a year or two; but throughout the long life of the unit.

for performance you can **BANK** *on*

SUPERIOR
STEAM GENERATORS

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

a preference based on performance

After sixty-eight years of service to Southern industry, Standard Oil products continue to be *first* in point of popularity. There's only one answer. To stay first your product must be *dependable,* your service *superior.* Standard Oil was first to offer special lubricants for power plant machinery, and for over half a century these have been improved to meet changing needs. Wherever there are moving parts—from one end of your plant to the other there are special types of Standard Oil lubricants to afford maximum protection. If you would keep your equipment running at peak efficiency and low maintenance cost, use Standard Oil lubricants.

STANDARD OIL
LUBRICANTS

The combined facilities for research, testing and engineering behind Standard Oil Lubricants are unequalled.

Standard Oil Company
(KENTUCKY)

here's how high temperature piping can flex its muscles

Each pipe hanger is scale tested to rigid tolerances by a skilled workman at the Navco plant. After final assembly and inspection, the hangers are carefully crated and readied for shipment.

NAVCO *Counterpoise* Pipe Hangers

Since high temperature piping has no respect for equipment connections, the entire piping system must flex its muscles to absorb the strain of expansion and contraction. This prevents serious stresses that could endanger the installation.

And how does high temperature piping flex its muscles? With Navco's precision engineered Counterpoise Pipe Hanger—the hanger with a load-supporting effort that is of constant value throughout the range of travel. This permits weightless movement of the entire piping system.

To learn how power plants, oil refineries and chemical plants can have piping systems that flex their muscles, write today for Navco's 12-page Counterpoise hanger bulletin #153.

NAVCO

NATIONAL VALVE & MANUFACTURING COMPANY

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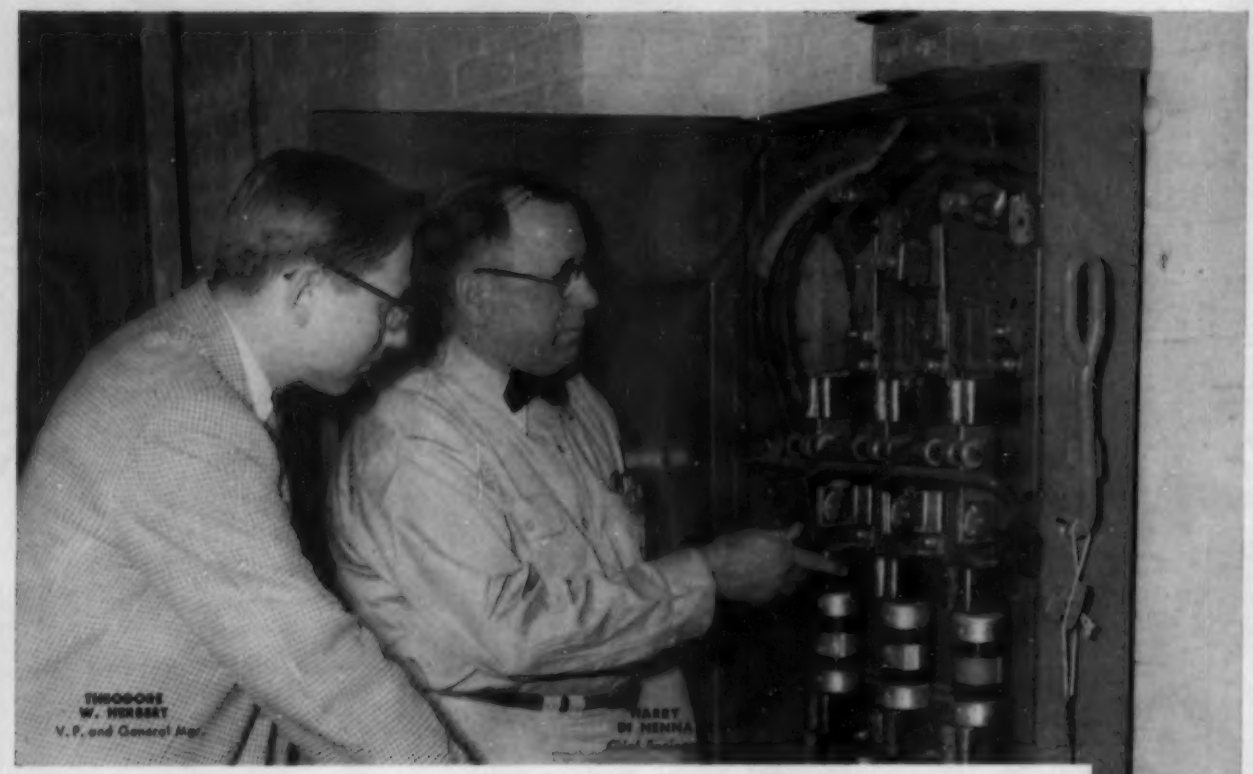
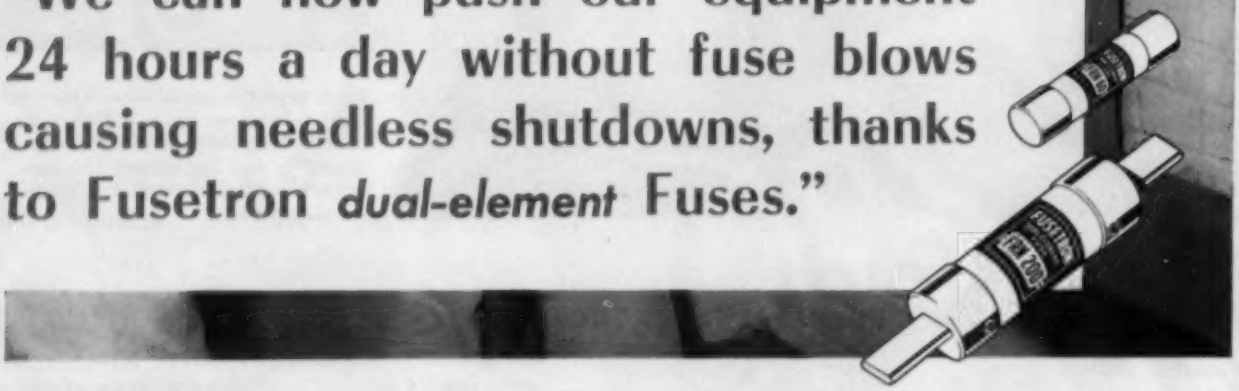


"We can now push our equipment 24 hours a day without fuse blows causing needless shutdowns, thanks to Fusetron *dual-element* Fuses."



"When we are on a tight schedule, we must operate 24 hours a day to fill our orders. Every piece of equipment in the plant is pushed to its limit. A work stoppage of any kind is more than annoying, it is most important as we just can't afford to waste time.

"We were using ordinary fuses to protect our motors, but these fuses couldn't hold up under the pressure. They would blow often and as I now know — needlessly.

"Every time a fuse blew we were losing money. I would start figuring how much harder and faster we would have to work to get back on schedule.

"Something had to be done. We called upon Mr. Paul Serotta of the Norristown Electric Supply Company. He recommended we discard our old fuses and replace them with Fusetron dual-element fuses.

"That was the answer all right. We can really notice the difference. Now, when we are on full production basis I am not worried that our equipment will be out of operation by the needless blowing of fuses."

Harry DiNenna
CHIEF ENGINEER
HERBERT HOSIERY COMPANY
NORRISTOWN, PA.

Play Safe! install Fusetron and BUSS Hi-Cap

Fusetron Fuses Do More Than Eliminate Shutdowns Caused By Needless Blows . . .

FUSETRON FUSES PROVIDE 10 POINT PROTECTION . . .

1. Protect against short-circuits.
2. Protect against needless blows caused by harmless overloads.
3. Protect against needless blows caused by excessive heating—lesser resistance results in cooler operation.
4. Provide thermal protection — for panels and switches against damage from heating due to poor contact.
5. Protect motors against burnout from overloading.
6. Protect motors against burnout due to single phasing.
7. Give DOUBLE burnout protection to large motors — without extra cost.
8. Make protection of small motors simple and inexpensive.
9. Protect against waste of space and money — permit use of proper size switches and panels.
10. Protect coils, transformers and solenoids against burnouts.

FUSETRON FUSES SAVE YOU Maintenance and Recalibration Costs

Once properly installed, Fusetron fuses require no costly inspection time or maintenance necessary on mechanically operated devices.

Dust, fumes, corrosion or age cannot prevent a Fusetron fuse from opening safely. There are no hinges, pivots or contacts to stick or slow down the operation of the fuse on short-circuit.

When a Fusetron fuse does open to protect, and after the fault has been corrected — the new Fusetron fuse you have installed has been *calibrated at the factory by engineers* — it is a fuse as safe and dependable as the one that blew.

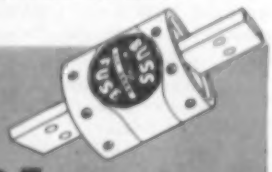
FUSETRON FUSES GIVE YOU GREATER SAFETY, BECAUSE OF THEIR HIGH INTERRUPTING CAPACITY

Tests verified by the Electrical Testing Laboratories of New York indicate that Fusetron fuses can interrupt safely the most severe available short-circuit current.

The tests circuits were set to deliver in excess of 100,000 amps. In each test the fuse cleared the circuit safely, the fuse remained intact, there was very little noise and cotton packed around the fuse was not ignited.

Yet there has been no interference with the time-lag characteristic of Fusetron fuses.

FOR LOADS ABOVE 600 AND UP TO 5,000 AMPS., BUSS Hi-Cap FUSES PROVIDE . . .



Unlimited interrupting capacity to handle any fault current regardless of system growth! This was confirmed by tests witnessed and reported upon by the Electrical Testing Laboratories of New York.

Overload protection as well as short-circuit protection.

Coordination with Fusetron fuses on feeder and branch circuits to limit fault outages to circuit of origin.

On old installations, a safe and relatively inexpensive way to protect inadequate circuit breakers against rupture in event of bad fault.

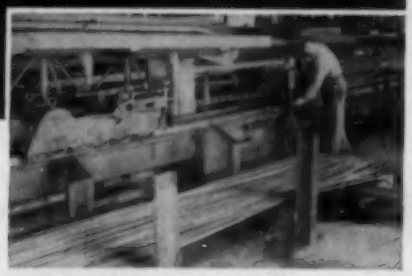
Dependable service through the years because there are no moving parts to stick or get out of order.

FUSETRON
TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION
BUSS

Blowing time charts and more information are available on FUSETRON Fuses and BUSS Hi-Cap fuses. Write for bulletin FIS and HCS.

BUSSMANN MFG. CO., (Division of McGraw Electric Company) University at Jefferson, St. Louis 7, Mo.

Fuses throughout the entire Electrical System!



"Drawing" process—mandrel controls inside diameter and die reduces outside diameter as tubing is drawn. Interior and exterior of tubing are smoothed in process.

For heat exchangers and condensers...
COLD DRAWN WROUGHT IRON TUBING

Here's your answer to *extra life* in tubing services. Cold drawn wrought iron tubing—because its composition and structure are the same as wrought iron pipe—provides the same time-proved protection against corrosion and fatigue failure. This longer service life advantage, combined with precise tolerances, make cold drawn tubing ideal for:

- ammonia condensers
- heat exchangers
- pre-heaters
- gas cooling apparatus
- gasoline condensers
- evaporators
- cooling pipe and steam condensers
- salt and brine lines in air conditioning services

The ability of cold drawn wrought iron tubing to reduce the frequency of repair or replacement in these and similar services is amply supported by actual service records.

You'll find it profitable to investigate cold drawn wrought iron tubing for your particular installation. We will be happy to discuss your needs. Just write or call.

A. M. Byers Company, Pittsburgh, Pa. Established in 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Department: New York, N.Y. *Available throughout the world.*

Annealing process restores ductility of the tubing. Ring gauge is then used to check OD, followed by a micrometer reading for wall thickness.

BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY STEEL PRODUCTS

Is it true what we say about...

DIXIE?

LOOK AHEAD — LOOK SOUTH

"LOOK AHEAD—LOOK SOUTH" to find America's great new industrial opportunity-land. That's what *we* say about Dixie—over and over again, year after year, in dramatic full-page advertisements in leading national business magazines and in financial publications. Is it true?...

The record speaks for itself. Last year, for example, new industrial developments in the territory we serve created more than 15,000 new job opportunities for men and women in the South. In the past ten years, the number of new plants, new and large distributing warehouses and major plant enlargements occurring along the Southern Railway System totaled 3,584.

Yes, it *is* true what we say about Dixie. And the years ahead hold the bright promise of still greater progress and growth. That's why we'll go right on saying, *"Look Ahead—Look South!"* All America will listen. And all in the South will benefit.

Harry A. DeButts
President

SOUTHERN RAILWAY SYSTEM

WASHINGTON, D. C.

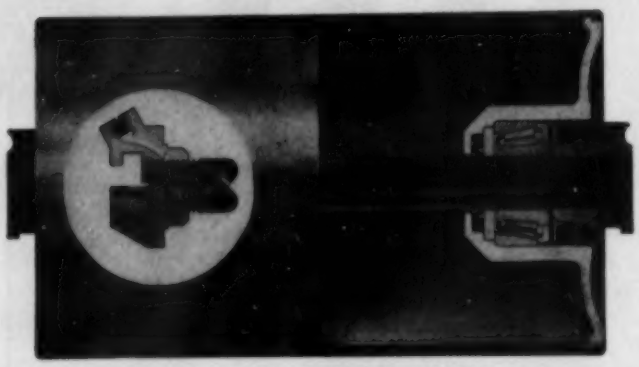
Specify CONTINENTAL

CONVEYORS AND ELEVATORS

For Minimum Maintenance—Lower Cost

Continental Products

- Apron Feeders
- Belt Feeders
- Heavy Manganese Feeders
- Flight Conveyors
- Chain Conveyors
- Screw Conveyors
- Screw Elevators
- V-Belt Drives
- Steel Pulleys
- Gears and Reducers
- Conveyor Belts
- Power Transmission Equipment



TYPE "UST" STANDARD IDLERS

Continental's Unit-Sealed "UST" Conveyor Idlers are pre-lubricated for longer life and minimum maintenance. Incorporating Timken Bearings and Garlock Klozures this construction permits operating the Continental "UST" Idler without lubrication for 1-2-3 years or more depending on the severity or character of conditions. Write for bulletin SI-116.

CENTRIFUGAL • CONTINUOUS
SUPER CAPACITY

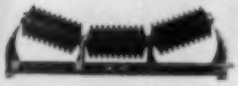
STANDARD AND HEAVY DUTY

Standard Troughing Idlers

Self-Aligning Troughing Idlers

Space Disc Idlers

Self-Aligning Return Idlers



Impact Idlers

Picking Table Idler

For Additional Data on Bucket Elevators Write for Cat. SI-521. CG-5405

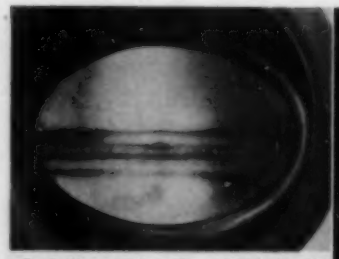
INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

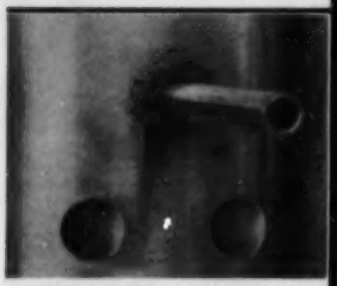
BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • KNOXVILLE CGC MANUFACTURERS

NEW YORK CITY

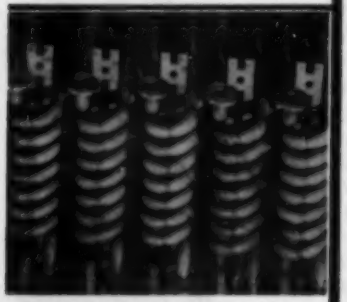


Typically smooth, uniform inside bead in stainless steel piping which results from making root pass with PP&E "free flow" inert gas shielded tungsten arc-welding process.



Stainless steel thin wall tubing is soundly welded to heavy stainless steel body by a skillful PP&E inert gas tungsten arc-welder.

Smooth external surfaces of welds on this component are the result of long experience in welding stainless steels.



Condenser coils of stainless steel, completely prefabricated at Pittsburgh Piping and Equipment Company.

Sound, clean joint having uniform root bead of correct internal contour is result of Pittsburgh Piping's tungsten arc-weld process which provides "free flow" of inert gas on internal and external surfaces of root pass.

EXPERT FABRICATION of Stainless Piping FOR POWER OR PROCESS

At PP&E we have been fabricating stainless steel piping since the middle 1920's . . . extended experience which is unsurpassed by any other power piping fabricator. The importance of this experience, to you, is its great value in avoiding errors in omission and commission which can result in inefficiency, damage to expensive equipment, and dangerous operating conditions. Consult our nearest representative for further information.

Promoting Progress **IN POWER AND PROCESS PIPING . . .**

Atlanta	Whitehead Building	Houston	Heights State Bank Bldg.
Boston	10 High Street	Los Angeles	1830 N. Alexandria Ave.
Chicago	Peoples Gas Building	New Orleans	P. O. Box 74
Cleveland	Public Square Building	New York	Woolworth Building

Pittsburgh Piping AND EQUIPMENT COMPANY

10 Forty-Third Street—Pittsburgh, Penna.

PP-9

Blaw-Knox metallurgist uses optical pyrometer to check pipe temperature in shop of Power Piping Division

. . . bending an offset in heavy chrome moly pipe for main steam line of Colbert Plant

You can readily appreciate that plenty of skill plus modern shop facilities are required to bend this 19½" OD x 3" wall, 2¼% chrome, 1% molybdenum pipe to strict specifications . . . which is being done in the Blaw-Knox Power Piping shop in Pittsburgh.

For example, wall tolerances must be within plus 0.125 and minus 0.000. Forging must be turned to provide an all-around increase in thickness on offsets to compensate for thinning of walls.

When bending the pipe, temperature must be within 1750° and 1950° . . . because alloy pipe becomes difficult to bend and is subject to cracking at 1650°. After bending to specified shape, the pipe is heat-treated and ultrasonically tested with a radar-type device for detection of any defects before shipment.

In addition to the main steam line of 419 feet of heavy alloy steel piping, Blaw-Knox is fabricating all the piping for the vent, condensate, boiler feed and heater drains in the TVA Colbert Steam Generating Plant near Tuscumbia, Alabama.

All these piping systems are being erected under the supervision of a Blaw-Knox supervisor and an engineer, on field location.

The same experience, skill and facilities of our Power Piping Division are always available to you . . . to help solve your piping problems and to quote on your requirements.

BLAW-KNOX COMPANY

Power Piping and Sprinkler Division

Pittsburgh 33, Pa.

BLAW-KNOX

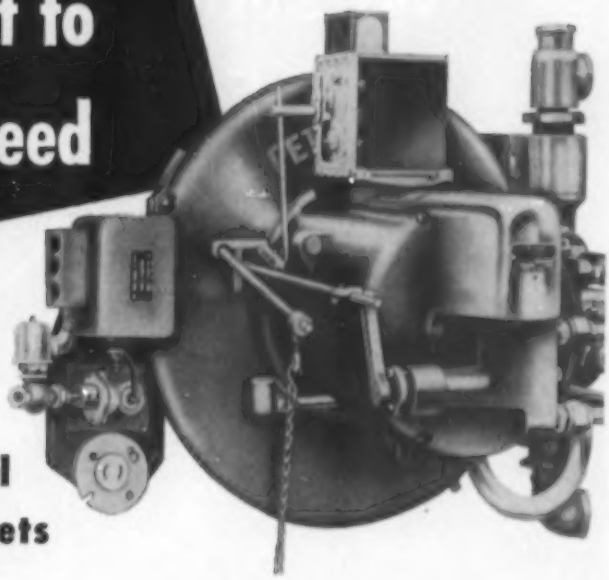
POWER PIPING

To get more information on piping for industry, write for your copy of Bulletin No. 2443.

Complete prefabricated piping systems for all pressures and temperatures . . . plus complete line of functional spring hangers • constant support spring hangers • rigid hanger assemblies • overhead roller assemblies • supports • vibration eliminators

Sure . . . you can cut firing costs by burning heavy fuel oil . . .

but you've got to control the oil feed



and Petro does this superlatively well without complicated gadgets

The so-called viscosity problem with heavy oils is overrated. This is so because the viscosity of *all* fuel oils approaches a common point as the temperature is raised, and the temperature at which viscosity becomes a negligible factor is well within a practical operating range.

The Petro thermal viscosity control system is simply this: an electric valve controlled by the oil temperature refuses to admit oil to the atomizing cup until the oil has reached a desirable burning temperature. This temperature is arrived at by circulating the oil through heaters when necessary. This accomplishes four important results:

1. Viscosity control permits accurate metering of oil.
2. Oil is thin enough for extremely fine atomization.
3. Hot oil ignites easily.
4. Petro *never* has a slug of cold oil in the feed line to foul up a cold start.

That is why the Petro burner can fire the economical heavy oils without a fearsome array of fancy trimmings. It is fool proof, gadget free, and completely dependable—all good reasons why Petro is the largest selling industrial oil burner in America.

A reservoir of warm oil is maintained. In the use of this thermal viscosity system, all of the heated oil which is not required for immediate firing is returned to the storage tank. Thus a constant pool of warm oil is ready for any changes in firing needs. The amount of oil being returned is easily regulated by the owner of the burner, to suit his individual needs.

No manual attention is required

The entire operation is automatic. There are no involved mechanical controls requiring adjustment or maintenance.

Saves labor costs—saves fuel costs

Why don't you find out how much Petro industrial oil burners can save for you? They are quickly adaptable to nearly every existing boiler. Send in the coupon below for full information.

PETRO

T.M. REG. U.S. PAT. OFF.

OVER 50 YEARS OF LEADERSHIP IN AUTOMATIC HEATING AND POWER EQUIPMENT

SEND FOR FREE LITERATURE

PETRO, 3234 West 106th Street, Cleveland 11, Ohio.
In Canada: 2231 Bloor Street West, Toronto, Ontario.

Please send me literature and specification sheets on money-saving Petro commercial and industrial burners.

Name_____

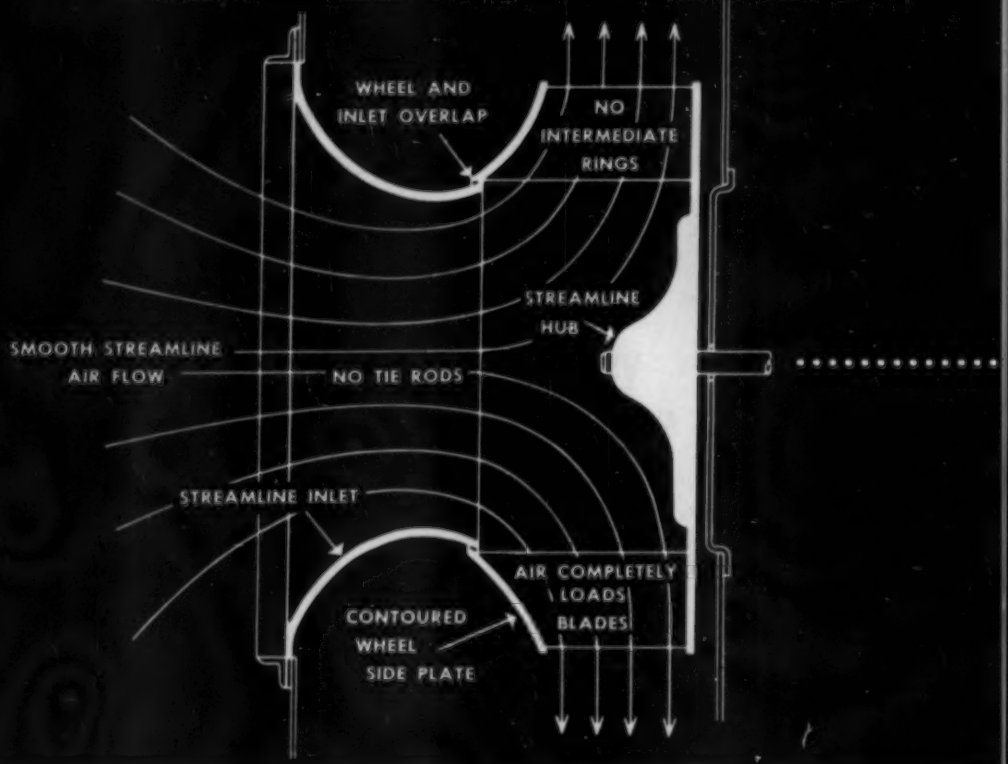
Company_____

Address_____

City_____ State_____

Fact:

Westinghouse Aerodynamic Fan Line More Efficient,



MECHANICAL EFFICIENCY 86%...
STATIC EFFICIENCY OVER 80%

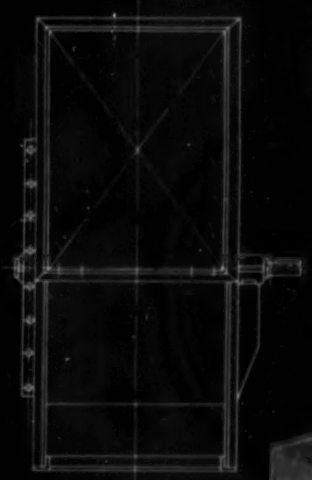
With unobstructed airflow through the wheel in all sizes, the "Silentvane" fan line also offers these other practical advantages:

1. **True self-limiting horsepower characteristic**
2. **Peak horsepower developed in normal selection range**
3. **Quiet, stable operation**
4. **Sharply rising pressure characteristic throughout normal performance range**

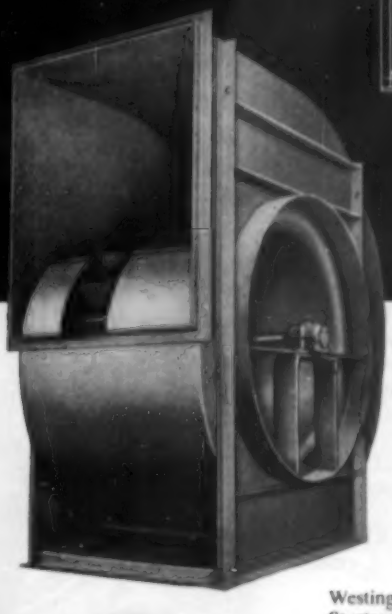
WIDE RANGE OF APPLICATION

Handling from 600 to 500,000 cfm, the performance-proved Westinghouse "Silentvane" fan line provides an almost unlimited choice of air moving equipment. Coupled with Westinghouse-Sturtevant power-saving Vane Control, "Silentvane" fans offer precise control of air volume at optimum efficiencies. In smaller sizes, 36" and under, fan arrangements are convertible.

Research Makes "Silentvane" Quiet, Non-Overloading



Rugged housing construction and angle iron bracing prevents vibration . . . means quieter operation.



AIRFOIL BLADING AVAILABLE

. . . where quiet operation and power evaluation are prime considerations—
65% less noise intensity . . .
92% mechanical efficiency.

MORE FACTS?

Call your nearest Westinghouse-Sturtevant Sales Engineer . . . he's the "Man with the Facts" on heating, air handling, and electronic air cleaning . . . or fill in the coupon below.

WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE . . . IF IT'S

Westinghouse

Z-60437

Westinghouse Electric Corp.
Sturtevant Division, Dept. 3C
Hyde Park, Boston 6, Mass.

I'm interested in your new booklet. Send me a copy right away.

NAME AND TITLE.....

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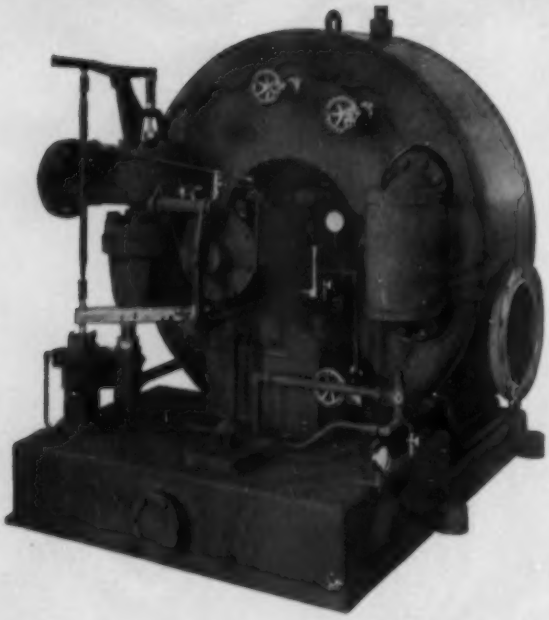
TROUBLE-FREE TURBINE OPERATION STARTS HERE



Terry solid wheel turbines have become a symbol for dependable, trouble-free operation. The reason—simplicity and ruggedness of construction.

Take the rotor, for instance. It's a solid forging in which a series of semi-circular buckets is milled. There are no separate parts to loosen or work out. Since the only function of the blades is to form a series of pockets, any wear which might occur would not materially affect horsepower or efficiency.

It is impossible for the blades to foul. They have large clearances and are further protected by the projecting rims at the sides of the wheel. As the side clearances are also very large, end play can do no harm.

Simplicity outside too—as you can see from the photograph of the 1500 HP at 3500 RPM solid wheel turbine above. This turbine is equipped with an oil relay governor and forced feed lubrication to the bearings.

For more about these *work horses of industry*, send for a copy of bulletin S-116. No cost or obligation.

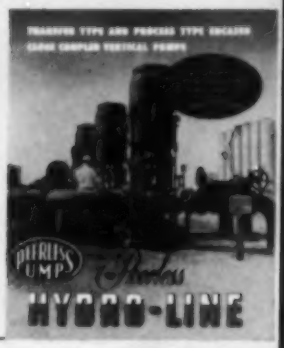
THE TERRY STEAM TURBINE CO.
TERRY SQUARE, HARTFORD 1, CONN.

TERRY

TT-1200

new VERTICAL Versatility

THE TREND IS TO VERTICAL PUMPS FOR TRANSFERRING MANY TYPES OF PROCESS LIQUIDS



HERE ARE TWO PEERLESS PUMPS THAT MEET THE NEED WITH ECONOMY, EFFICIENCY AND DEPENDABILITY—The two new Peerless pump bulletins shown at the left above describe the two types of modern Peerless process liquid pumps shown installed at the right.

Write for your copies. They describe and illustrate the pluses of Peerless vertical process pump design, construction and operation.

Bulletin No. B-1700 describes Peerless Hydro-Line can type pumps; Bulletin No. B-505 describes Peerless industrial service pumps. Both types are applied to the successful transfer of processing liquids. *Use the coupon below.*

PEERLESS PUMPS

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PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Factories: Los Angeles 31, Calif. and Indianapolis 8, Ind.
Offices: New York; Atlanta; Chicago; St. Louis; Indianapolis; Phoenix; Fresno; Los Angeles; Plainview and Lubbock, Texas; Albuquerque, New Mexico.
Distributors in Principal Cities; Consult your Telephone Directory.

PEERLESS PUMP DIVISION
Food Machinery and Chemical Corporation
301 West Avenue 26, Los Angeles 31, California

Please send bulletins checked below:

☐ PEERLESS HYDRO-LINE CAN TYPE PUMPS B-1700

☐ PEERLESS VERTICAL INDUSTRIAL SERVICE PUMPS B-505

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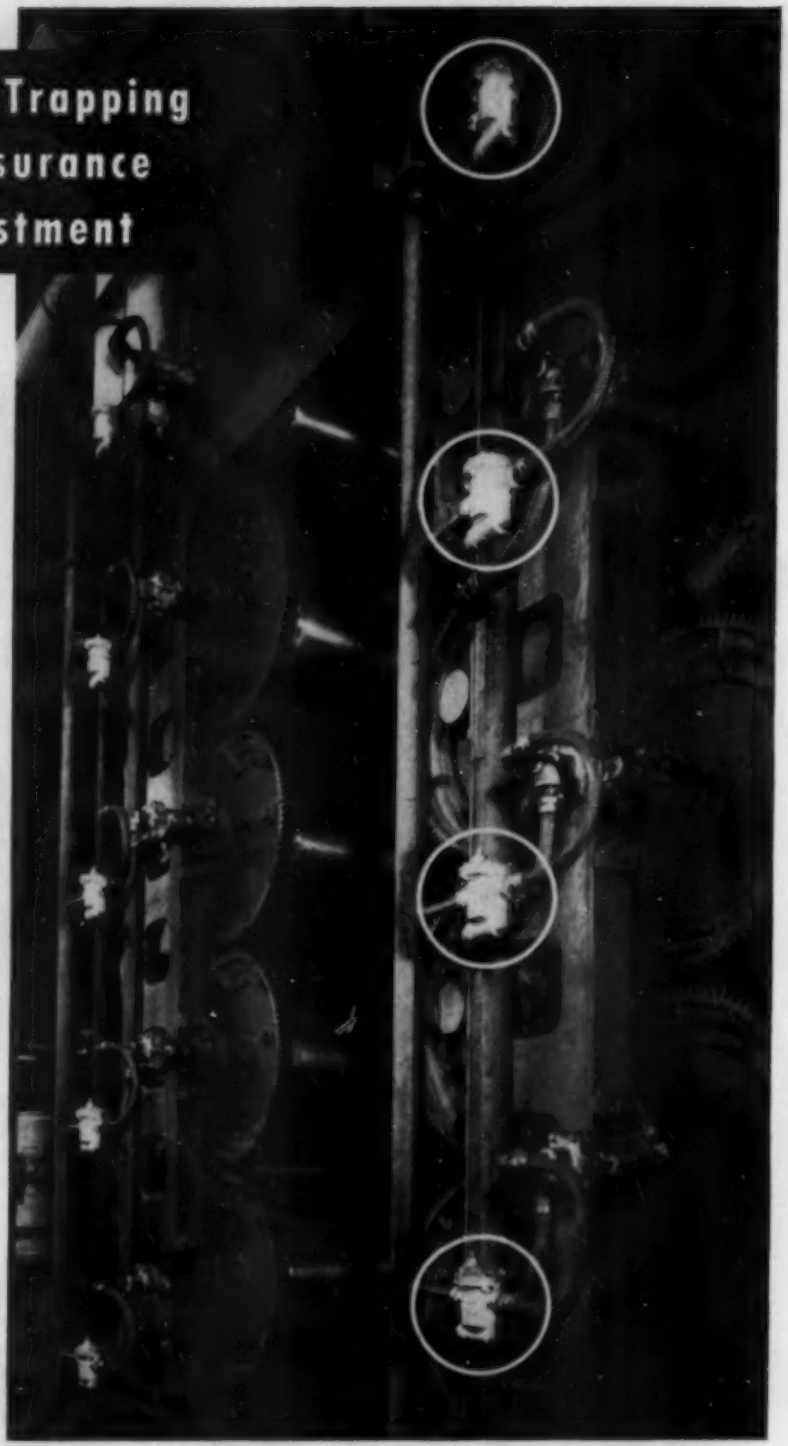
Armstrong Unit Trapping —Low Cost Insurance of a Big Investment



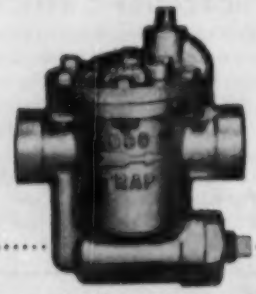
● *30% more production from kettles . . . 84 degrees higher dryer temperatures . . . 8% more output from dry kiln*—these are typical results of unit trapping with Armstrongs.

What about your plant? It doesn't make good business sense to spend $500, $5000 or $50,000 for equipment and then lose 10% to 30% or more of its productivity for lack of proper trapping.

Armstrong traps are "application engineered" by men who know trapping thoroughly—how to size traps for fast heat-up and top temperatures . . . correct installation practice . . . steam supply and return line requirements . . . variable pressure problems . . . mysterious difficulties. The cost of retrapping with Armstrongs is usually but a fraction of 1% of the cost of the equipment drained—*low cost insurance of a big investment!*

Call your Armstrong Representative today. He sells on a basis of "satisfaction or your money back." Or, write:

ARMSTRONG MACHINE WORKS
806 Maple St., Three Rivers, Mich.



Armstrong built-in strainer traps, pictured on textile dry cans at the right, cost less to buy and install than standard traps and separate strainers—they reduce maintenance and costly shutdowns. Three sizes, ½" or ¾" connections.

SEND FOR FREE STEAM TRAP BOOK . . .

. . . 44 pages of how-to-do-it data. Useful and educational. Free on request without obligation.

S43

ARMSTRONG STEAM TRAPS

"Under Way On Nuclear Power"

As she blinked this terse message, the *USS Nautilus* cast off and steamed to sea leaving an old era of oceanic travel in its wake.

This is the first nuclear-powered, steam-turbine-driven submarine ever to be built. With the eyes of the world watching, it was a project with no margin for failure. Exhaustive sea trials which tested every feature of her equipment proved that the only acceptable result—success—had been completely realized.

We take pride in Walworth's share in this momentous achievement. For, from the days when the *Nautilus* was still on the drawing board to the last stage of construction, Walworth engineers worked directly with the Electric Boat Division of the General Dynamics Corporation—helping with the myriad of piping problems this new concept of transportation posed. Now the *Nautilus* prepares to join the fleet with Walworth Valves and Fittings, both standard and special items, installed.

We are glad to be aboard.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS
THROUGHOUT THE WORLD

When you specify Chapman Steel Valves you also specify steels designed for your specific services. Standard alloy steels match every normal industrial requirement. Special alloys can be furnished for extraordinary service conditions. All metals are poured in Chapman's own foundries under rigid laboratory supervision.

Exceptionally close machining tolerances are another standard feature of Chapman Steel Valves. Under the most severe conditions, Chapman Steel Valves seat tightly and positively, without jamming, chattering, or wearing excessively. Operation remains smooth and dependable; maintenance costs stay low.

See Chapman *first* for gates, globes and checks in all pressure classes — 150, 300, 400, 600, 900, 1500 and 2500 pounds — and for temperatures to 1150°F. Valves are available with welded, pressure seal, or bolted bonnet joints and with flanged or welding ends. ASA standards are equalled or exceeded in every range. Write for Catalog 20.

THE CHAPMAN VALVE MANUFACTURING COMPANY
INDIAN ORCHARD, MASSACHUSETTS

TIMELY COMMENTS

Standardization, Then and Now

PERHAPS lack of standardization is not the main reason the South lost the Civil War—but certainly it played an important part.

Equipped with mine detectors, Civil War hobbyists (The Round Table Group) are digging into old trenches and fortifications for mementos and information. They do not work very hard on this project individually, but the cumulative information discussed at the "Round Table" is considerable.

For example, over twenty-five (25) different sizes of bullets were used by the Confederates. And the rail spacing (gauge) of roads varied from State to State. Consequently cars had to be unloaded and reloaded at state lines.

Imagine fighting a war under these handicaps —supplying various kinds of guns with ammunition over railroads that changed rail spacing every now and then.

The more industrialized North had already advanced beyond these handicaps. Excavations show considerable consistency in size and design of "Yankee" equipment. Even in that early time they had learned some of the advantages of standardization.

Advances have continued and industry today is greatly aided through standardization. But the struggle is a continuous one. Each new development brings a host of nonstandarized solutions to new problems. Standards committees are continually at work, and their job will never be finished.

An Engineering Triumph

THE ATOMIC powered Nautilus, now undergoing sea tests, has been described by its chief Naval developer as ninety per cent engineering and only ten per cent physics.

That description was given by Rear Admiral H. G. Rickover in a tape recorded radio program, "The USS Nautilus—An Atomic Age Engineering Triumph," distributed for broadcasting during National Engineers' Week, February 20-26.

Pointing out that the famous equation of Einstein which indicates the relationship between matter and energy has been known for years, Admiral Rickover stated that what we are seeing now is a concentrated engineering effort directed toward making practical use of that and other scientific theories.

The Admiral emphasized that the atomic submarine project had resulted in the accumulation of a vast amount of technical know-how concerning the design and construction of small scale atomic reactors that will prove invaluable to engineers for the industrial development of central station atomic power plants.

Neglect is Like a Termite

Neglect in many industrial procedures may continue for months, or even years, without any dramatic evidence calling it to the attention of plant management.

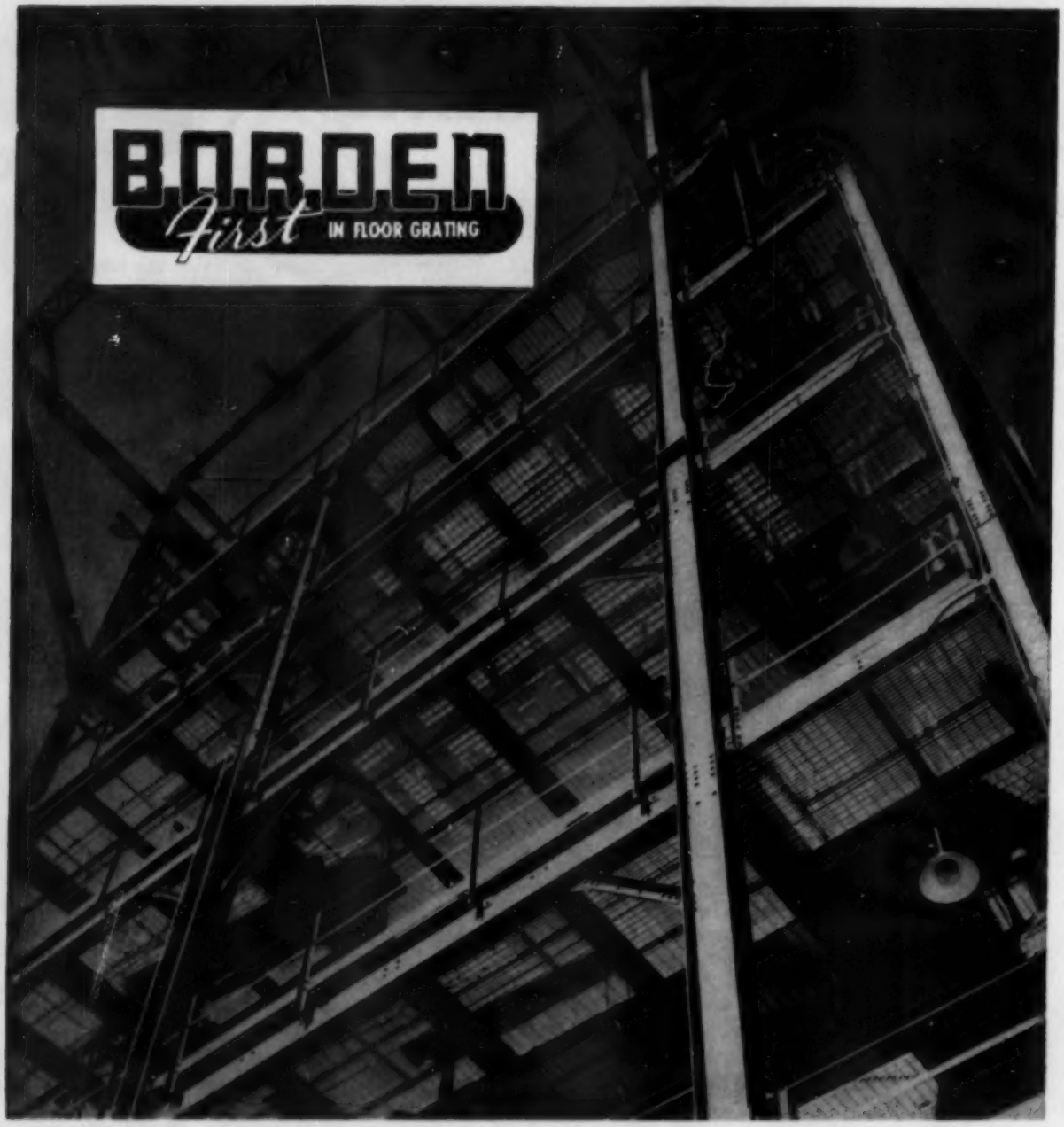
True enough, such operating negligence, as failure to keep processes in order, excessive material waste, soiled product, etc., is soon caught. But in other cases neglect is an insidious thing which so slowly saps plant economy that day by day and week by week comparisons fail to indicate anything really wrong.

Particularly in maintenance, neglect can go on in some instances for years without breakdowns, or sudden increases on the cost sheet. For example, insulation may be damaged and left unrepaired, little by little, until the accumulated losses become appreciable. Painting can be neglected a long time before actual failure shows up. Vibration may take years to cause serious crystallization—and so on.

Record keeping is another place where neglect does not result in sudden trouble. Maintenance and operating records may both be allowed to gradually deteriorate toward a worthless state, without showing either on the cost sheet or as equipment failures.

Consequently there is no substitute for competent men on the job. Rather than hope to catch each error, or each case of neglect as it occurs, supervisors can better spend their time in working closely with their men, so that each workman's character may be understood.

The first essential characteristic of any man on any job is a genuine desire to give good performance. A man with this desire is likely to be worth training into a position of trust. On the other hand, managers that employ shirkers or evaders must become reconciled to ever watchfulness—and even so a feeling of uncertainty with regard to conditions in the plant will be their fate.



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INDUSTRY SPEAKS

SOUTHERN POWER AND INDUSTRY

Perhaps It's Time for a Recheck

Growth . . . With a CAPITAL G

In **Hendersonville, North Carolina,** industrial leaders from throughout the Carolinas and the South recently participated in groundbreaking ceremonies of the new multi-million-dollar headquarters for the **General Electric Company's Outdoor Lighting Department.** The following is adapted from comments by **Philip D. Reed,** Chairman of the Board of Director of the General Electric Company.

IT HAS been aptly said that if your impressions of the Southeast are more than five years old, you had better make a recheck. About five years ago, the General Electric Board of Directors made an official visit to Georgia. We admired the climate, the dogwood, the violets, and spring. But there was another kind of "spring" in the air too. New plans, new plants, new industries were springing up wherever we went.

Strongest of all the impressions I received was the continuing expansion of electric power requirements. I know of no better index of a nation's or a region's progress and potential economic growth than a rapidly rising curve of electric power generation.

It has been too long since I visited North Carolina and I am very glad to be back for a recheck. It is obvious that you are still bustin' out in an epidemic of industrial activity.

The South has changed more in the last fifteen years than in the previous fifty, and more in the last five than the previous fifteen. Miles and miles of brand-new factories, as modern as day-after-tomorrow, line your countryside.

The future of North Carolina is based upon figures that I do not need to cite to this audience: a growth in population faster than the national average; markets that are growing faster than population; leadership in cigarette, textile, and furniture manufacture, and new diversification in electronics, chemicals, specialties; increased value of farm property and value added by manufacture; rising industrial payrolls and farm income; multiplying demands for electric energy.

During the last five years the electric utilities of this state have increased their generating facilities by a million kilowatts. That's growth with a capital G. Carolina Power and Light Company is in the midst of a two hundred million dollar construction program. Duke Power is now creating a single station with a continuous capability of a million kilowatts.

General Electric has, or is planning, four plants in North Carolina. In addition to plants at Asheboro, Goldsboro, Hendersonville, and Hickory planned or in being, plants have been added at Rome, Georgia; Anniston, Alabama; Memphis, Tennessee; Lexington, Owensboro and Louisville, Kentucky; Jackson, Mississippi; and Jonesboro, Arkansas. These plants, producing a wide variety of products ranging from electronic tubes, transformers, automatic blankets, automatic washers and dryers, dishwashers, ranges, lamps, outdoor lighting equipment, and small motors, are contributing importantly to the diversified economy of the South.

The Hendersonville, North Carolina, plant will manufacture street and flood-lighting equipment, traffic control systems, and military and airport lighting products. Like so many other fields of this various and diverse electrical industry, we expect the demand for these products to double in the next ten years.

Ours is still a young, vigorous and growing industry. Its rate of growth will be, in part, a function of the efficiency of our operations, reflected in wide availability and low cost of electric power, and also in part on the ingenuity of ourselves and others in finding ever new and ever more uses for that power.

And if, as I believe, new uses for electric energy will continue to emerge in direct proportion to the manpower and dollars devoted to research, there can be no question that demand for power will broaden and deepen with each passing decade.

General Electric Company's plant at Hendersonville, N. C. will be called the **"Outdoor Lighting Center of the World."** Plant will be pushed to full operation as early as possible in 1956 and eventually will employ upwards of 600 persons. It will be a completely integrated industrial component with its own administrative, research, design, engineering, production and marketing facilities and personnel. **L. Byron Cherry, General Manager** of the **Outdoor Lighting Department,** will make his headquarters at the new plant.

ALABAMA POWER COMPANY'S NEWEST PLANT NEAR MOBILE has initial capacity of 250,000 kw in two units. Coal fired boilers operate at 1875 psig and 1000 F. Exhaust from the high pressure turbine section is reheated to 1000 F and returned to the intermediate section.

BARRY STEAM PLANT—Alabama

This article was prepared by: M. C. BRICKELL, Mechanical Engineer; K. W. BOYLES, Electrical Engineer; and P. FISCHER, Structural Engineer—all with the Design Engineering Department of Southern Services, Inc., Birmingham, Alabama

THE site of the new Barry Steam Plant of the Alabama Power Company is about 23 miles north of Mobile, Alabama, on the right bank of the Mobile River. The initial installation consists of two 125,000 kw units with provision for ultimate extension to 1,000,000 kw. The plant is served by the Southern Railway and is only a short distance east of U. S. Highway 43.

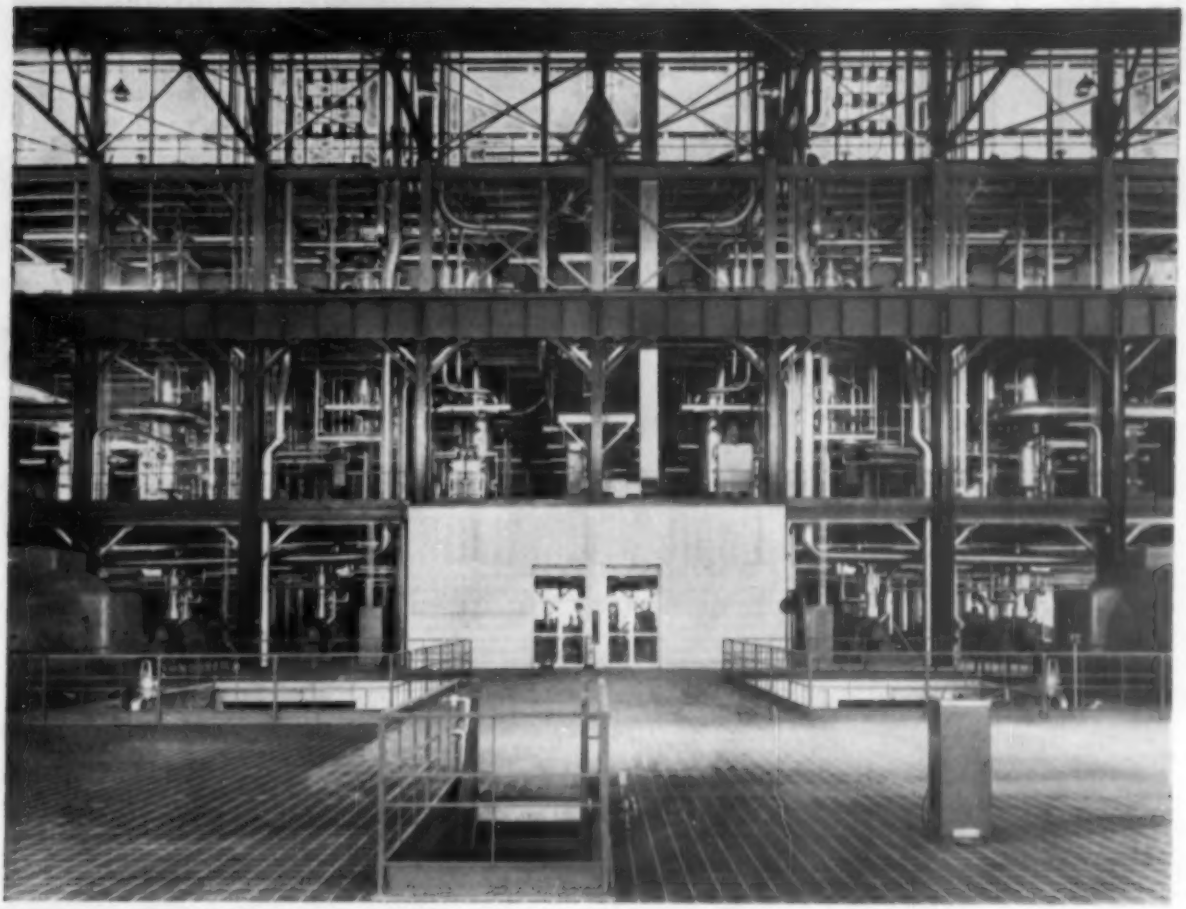
BARRY Steam Plant is fueled with coal, and provided with unloading facilities for barge or rail delivery. A barge canal has been dredged from the river into the site with facilities for unloading 2,000 ton barges. This coal travels down the Warrior-Tombigbee River System from mines in northwest Alabama. A 3-car track hopper, with two car shake-outs, is provided for receiving coal delivered by rail. This same hopper has facilities for reclaiming coal from the storage pile.

The area in which the plant is located is heavily wooded. A soil profile at the plant location consists roughly of a 20′ layer of sandy clay, approximately 100′ of medium to dense sand followed by a thick layer of stiff, sandy clay. The finished surface of the ground in the plant area has been set at 21′ above sea level. The water table is approximately 20′ below the ground surface.

Buildings and Foundations

The powerhouse substructure is essentially a 4′ thick reinforced concrete slab set 17′ into the ground, with cantilever walls 18′-16″ high. The cooling water passages are beneath the slab, with one tunnel on top of the other (intake tunnel on bottom). This arrangement of tunnels was used in order to obtain extra depth for the intake water and to guard against loss of pump submergence under extreme low water conditions.

The whole substructure is supported on approximately 3200 untreated wood piles about 70% of which were cut from trees on the



VIEW FROM TURBINE ROOM toward boiler house. Control room is in center of picture.

site. Originally it was not deemed necessary to place piles under the outside water passages and intake and discharge structures. However, since the excavation for the discharge structure and outside tunnel revealed a seam of plastic clay, piles were driven through this seam for support. The intake structure and outside connecting tunnel were placed directly on the sand.

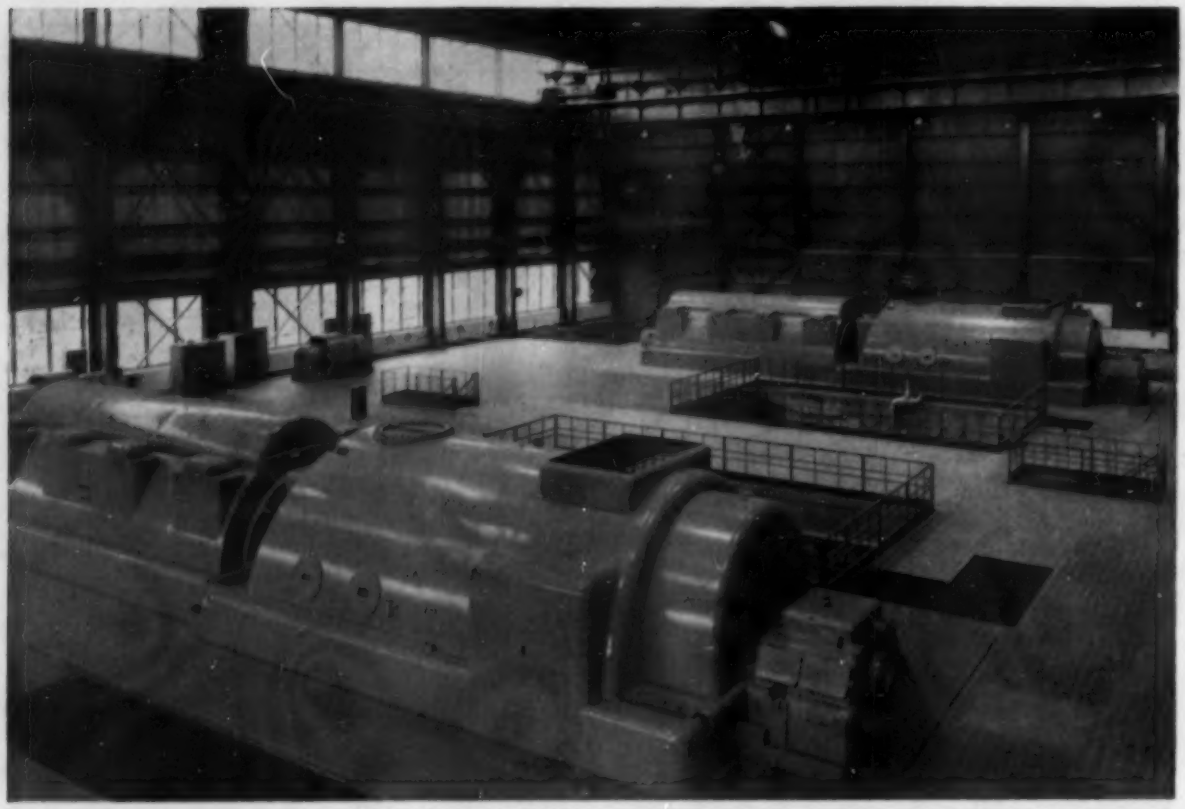
Shallow foundations for the Office Annex and various outdoor structures, such as the chimney and coal handling structures, were placed on precast concrete piles, since they projected above the water table. The coal handling track hopper, which extends 29′ into the ground, is founded on medium to dense sand without piling. The barge unloading coal hopper on the bank of the barge canal is founded on wood piles and protected on the water side with sheet piling which also serves as a form for the outside concrete wall.

The barge canal also serves as the cooling water intake canal. The intake structure is located on the banks of the canal and has six screen bays to serve four 125,000 kw units. Each screen can handle 96,000 gpm at low water. Three traveling water screens are now installed to serve the present installation of two units. After the circulating water leaves the condenser, it is discharged into a swampy area on the side of the plant opposite the intake. This results in a water circuit approximately 3 miles in length, thereby eliminating any possibility of recirculation of cooling water. The minimum flow in the Mobile River at the plant site has been estimated to be on the order of 5000 second feet. However, tidal fluctuations in Mobile Bay influence the flow past the plant, and for this reason, the possibility of recirculation was given careful consideration.

The powerhouse superstructure is a conventional steel frame building consisting of Generator Room, Boiler House, and attached Office Annex. The Generator Room and Boiler House have walls of corrugated asbestos siding, and the Office Annex has outside walls of face brick and back-up tile, while the interior partitions are of hollow tile. Window sash is galvanized steel, and the window frames, set in corrugated asbestos siding, are made of extruded aluminum shapes.

The floors in the Boiler House are reinforced concrete slabs and steel grating. The Boiler House roof is a poured 4″ reinforced concrete slab, and the roofs of the Generator Room and Office Annex are

(Continued on following page)



THE PRESENT INSTALLATION is two 125,000 kw units. Capacity may ultimately be increased to 1,000,000 kw.

precast concrete channel slabs. Roof covering is the usual 4-ply tar and gravel coating.

Summer climatic conditions in the Mobile area required that special attention be given to the ventilation of the powerhouse and Office Annex. Air is removed from the upper part of the Boiler House by twelve 60" and four 48" round stack type, fan operated ventilators mounted on the roof of the Boiler House. Twenty-four 48" round stack type, fan operated ventilators exhaust air from the Generator Room.

The forced draft fans for the boiler (located in the basement) function, incidentally, as exhausters for the lower part of the Boiler House and the Condenser Room since they require approximately 780,000 cu ft of air per minute, which is pulled through the lower windows and louvers in the outside walls. Ventilation throughout the building is materially assisted by the large open floor areas which are covered with floor grating.

The twelve 60" ventilators on the roof of the Boiler House are provided with reversible motors so that they may draw in air during cold weather to supply the forced draft fans when a large percentage of the windows are closed. The coal conveyor gallery is ventilated by a large axial flow fan placed at one end of the gallery which draws in fresh air from intakes at the opposite end of the gallery.

The Office Annex furnishes about 25,000 sq ft of floor-space, although only about 15% is actually occupied by offices. The remainder is taken up with such functions as storage space, machine shop, toilet and locker rooms, lobby, etc.

The office portion is heated and air-conditioned by means of a heat pump installation. The Assembly Room is heated and air-conditioned by a conventional unit served by steam coils and refrigerating coils. The remaining areas are ventilated by air exhausters on the roof or by air circulating through open windows.

The Control Room enclosure is inside the main building on the operating floor and adjacent both to the Boiler House and Generator Room. It is completely air-conditioned. Enclosure walls for the Control Room are insulated aluminum panels with a light steel frame backing. Complete toilet facilities as well as a small kitchenette are provided for the convenience of the operators.

Turbine Generators

Two General Electric 125,000 kw, .85 pf, tandem compound, reheat, double flow, 3600 rpm turbine generators are installed with centerlines crosswise the turbine room. The 23 stage units are designed for throttle conditions of 1800 psig and 1000 F and exhaust pressure of 2" Hg absolute. The 8th stage is the exhaust to the reheater and also the top extraction point for feedwater heating.

Steam is exhausted from the high pressure section at 405 psia and 638 F, at full load, and returns to

the intermediate section at 1000 F. In addition to the 8th stage, steam for feedwater heating and deaeration is extracted from the 10th, 13th, 16th, and 19th stages.

The generators are rated 147,059 kva (with 0.5 psi hydrogen pressure), 18,000 v, 3 phase, 60 cycle. The units are equipped with motor driven exciters, with one spare for the two units, with amplidyne voltage regulation.

The lubrication and governor oil is conditioned by continuously circulating 18 gpm through combination precipitation and filtration units. One 10,850 gpm three compartment oil storage tank and transfer pump is located on the base slab in a fireproof room.

Condensers and Auxiliaries

The turbines exhaust to 87,000 sq ft condensers located directly below and at right angles to the turbine shafts. The condensers are cross-flow, two-pass, divided water box type and are connected to the turbine exhaust through a single convolution steel expansion joint.

The condenser hotwell is the deaerating type and gases are removed by duplex mechanical vacuum pumps, with one spare pump provided for two units. Hotwell level is maintained by an air operated control valve in the condensate pump discharge line which is actuated by a torque tube float chamber located on the hotwell.

Condensate recirculation is used only as minimum flow protection for the condensate pumps. The recirculation control valve is actuated, through a pneumatic switching valve, from the condensate control valve and is set to provide 125 gpm minimum flow through the pumps. Two 1500 gpm horizontal, 4 stage, self-regulating, 475 ft TDH condensate pumps and two 44,500 gpm vertical circulating water pumps are provided with each condenser.

Steam Generators

Two 900,000 lb/hr tangentially fired, single drum, bent tube, Combustion Engineering, Inc., radiant type steam generating units supply steam to the turbines. The design pressure is 2100 psi, and the units are equipped with reheaters designed for 550 psi and a steam flow of 800,000 lb/hr with an outlet temperature of 1000 F. Steam conditions at the superheater are 1875 psi and 1000 F.

The furnace walls are water cooled by tangential tubes on the front and sides and by finned roof tubes. The water wall area is 44,720 sq ft. The furnaces are corner fired by 16 tangential burners which are suitable for pulverized coal or natural gas and can be tilted to control superheat and furnace slagging. Each burner is equipped with 5 gph automatic oil ignition torches which can be operated remotely from the central control room for stabilizing the fires during low load operation.

The steam generators are equipped with Elesco superheaters and reheaters. The total surface in the two stage superheater is 80,850 sq ft, and the surface in the reheater is 20,200 sq ft. Constant superheat is maintained between flows of 650,000 lb/hr and 900,000 lb/hr, and constant reheat temperature is maintained between flows of 580,000 lb/hr and 800,000 lb/hr.

The steam generators are also equipped with Elesco continuous loop, horizontal fin tube economizers. The surface in the economizer is 25,600 sq ft. Two Ljungstrum regenerative air preheaters with a surface of 102,000 sq ft each are furnished with each unit.

The furnace bottoms are of the flooded type arranged for water jet removal of the ash which is sluiced to a sump located between the present two units and the future two units. From here it is pumped to the disposal area by a rubber lined ash pump. A complete standby pump and piping system is provided.

Ash disposal piping within the building is Ashcolite, and the outside piping is cast iron mechanical joint type. Overflow from the flooded hoppers is discharged to the disposal area by a separate rubber lined pump, discharging into one of the ash disposal lines.

Soot hoppers are emptied by the use of air-electric soot valves and hydrovactors which discharge into air detraining tanks, from which the soot and water flow by gravity to the ash disposal area.

The soot valves are equipped with automatic sequential controls. The pulverizers are equipped with tramp iron hoppers which are emptied by a hydrovactor discharging into the ash sluice trench.

Boiler Auxiliaries

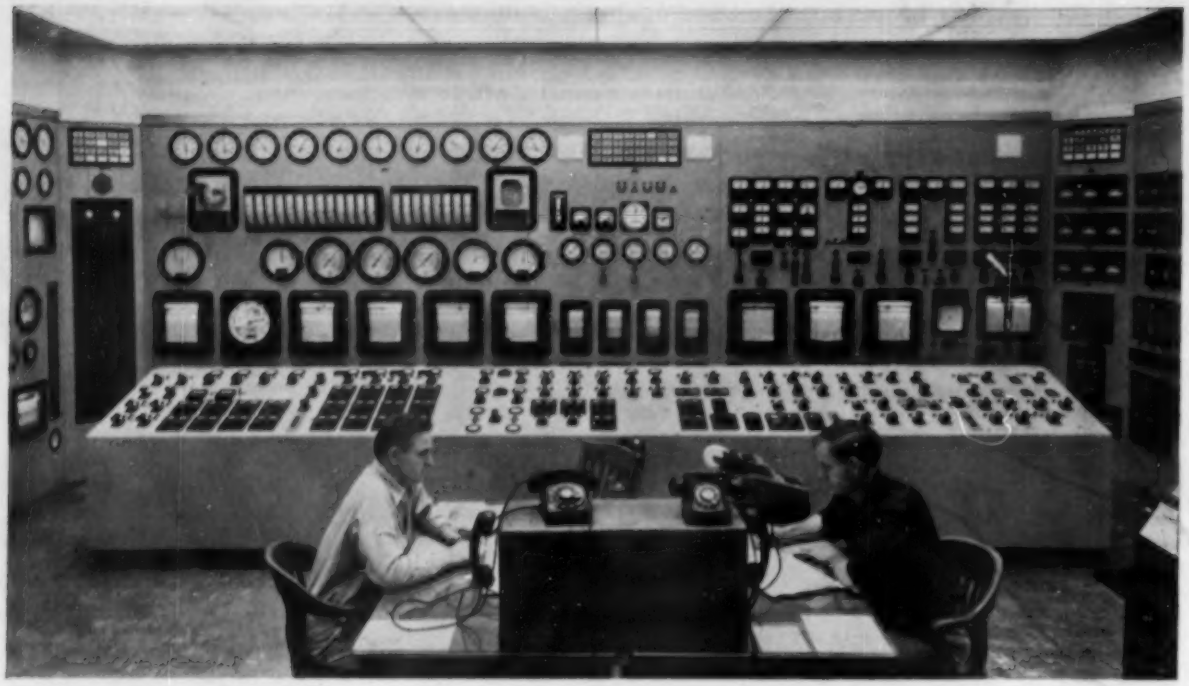
The forced draft fans (two per unit) are located on the boiler room base slab and are regulated by scoop-tube type hydraulic couplings. Each fan has a capacity of 195,000 cfm of air at 100 F and a static pressure of 11.9 inches of water. The induced draft fans (also two per unit) are located outside the building at yard level and are also regulated by scoop-tube type hydraulic couplings.

Each induced draft fan has a capacity of 276,000 cfm of gas at 260 F and a static pressure of 18.2 inches of water. The fans discharge into a 200 ft (height above ground level) concrete chimney which serves both units. A multiclone type dust collector is located on the suction side of the induced draft fans for fly ash removal.

Coal is fed to the pulverizers from a 1600 ton (per unit) continuous coal bunker. All crushed coal is weighed by automatic batch scales and is discharged through vertical chutes to the mill feeders. Variable speed feeders are located on the operating floor and feed the pulverizers which are located on the boiler room base slab. Each boiler is supplied with four Raymond bowl mills which have a capacity of 33,000 lb/hr each.

Soot blowers are automatically controlled from a sequential control panel located in the central control room. High pressure saturated steam is used for all boiler cleaning except the air heaters. Steam for the air heater blowers (located on the gas side) is superheated steam reduced in pressure by passing through an orifice.

Six retractable blowers are installed in the low temperature stage of the superheater and six more in the reheater and high temperature superheater space. Provision is made for the addition of fourteen additional retractable blowers in the event they are justified by operating experience. Twenty-four wall blowers are provided, twelve



THE CONTROL CENTER is designed for complete centralized control of the two units. Control signals are electronic and air pressure is the power medium.

above the burners and twelve below, with provision for sixteen additional wall blowers if they are required.

One Diamond Bi-Color water column equipped with a diamond Utiliscope for viewing in the control room is furnished with each boiler. One Yarway water column is installed on each boiler in the common aisle between the two units so the mirrors can be viewed from the control room. The Yarway column is equipped with a remote indicator mounted on the boiler control panel in the control room. One Republic Flow Meters Company equalizing column is installed on each drum with a meter body connected for transmitting the level to the drum level recorder in the control room.

A diamond Utiliscope camera is installed in the front and near the top of each boiler for viewing the furnace interior from the control room.

Feedwater System

Each boiler is fed by two 1100 gpm, 10 stage, horizontal, barrel-type centrifugal pumps, and one standby pump is provided for each boiler. The impellers and difusers are 11 to 13% chrome steel, and the impeller rings are 17% chrome steel.

The pumps are furnished with automatic hand-reset minimum flow valves which open when the flow through any pump is less than 125 gpm. This flow is by-passed to the deaerating heater storage tank. The pumps operate at variable speeds through a three element drum level control system and are controlled by fluid drives.

A pneumatic feedwater regulator valve is installed for drum level control if the fluid drive controls are inoperative. The pumps and motor drives are lubricated from shaft driven pumps.

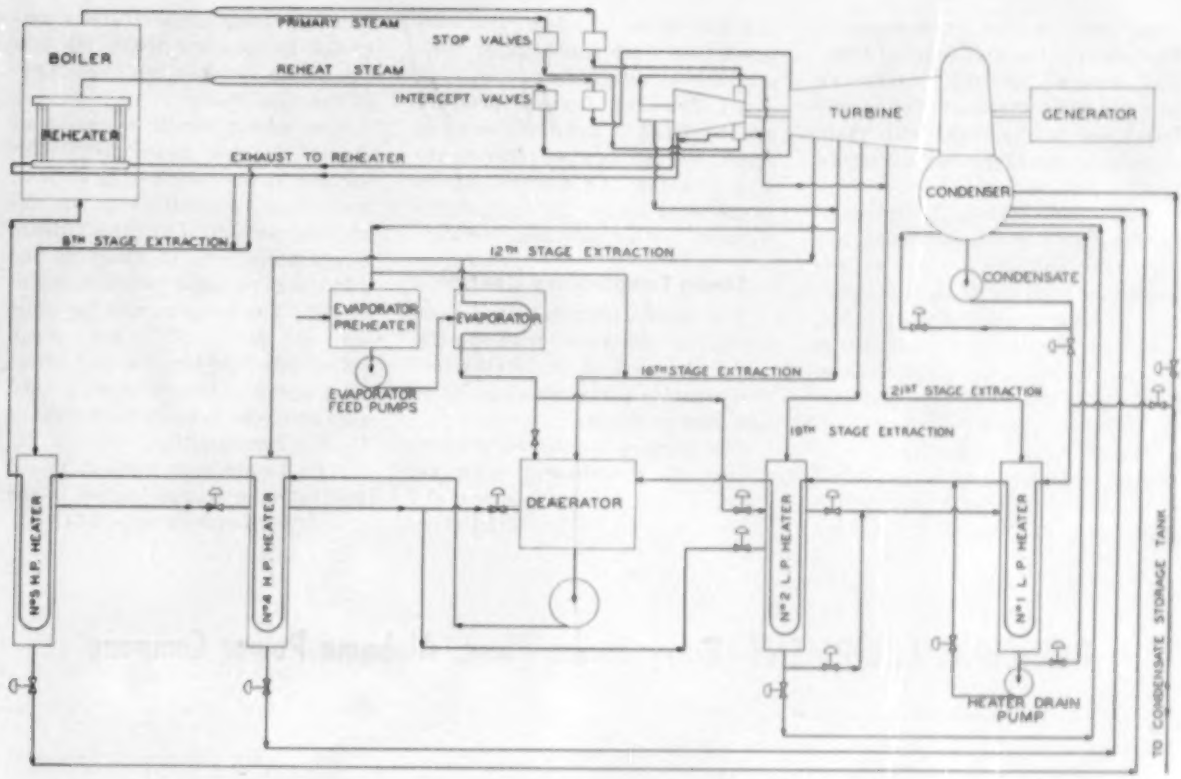
Condensate is pumped through two low pressure heaters to the deaerating heater (located on the boiler room roof), which discharges the deaerated condensate to an integral 150,000 lb capacity storage tank. The boiler feed pump suction is from this storage, and the pumps discharge to the economizer through two high pressure heaters.

All make-up, either raw river water or well water, is passed through a small deaerating heater and then pumped to the evaporator. Evaporated water is condensed in the main deaerating heater. Reserve condensate is stored in a 150,000 gallon steel tank.

Provision is made for circulating water through the feedwater system to remove air after a shutdown. For this purpose, a Fisher reducing valve supplies live steam from the boiler to the deaerator during periods in which the deaerator pressure is below 5 psig.

The two high pressure heaters and the second low pressure heater are equipped with integral drain coolers. All drains cascade to the next lower pressure heater or drain directly to the condenser. At extremely low loads, the differential between two heaters is not sufficient to overcome the static head through the vertical drain cooler, and all heaters drain directly to the condenser.

The throw-over from the condenser to the next lower pressure heater is automatic and is controlled by two Fisher torque tube level-trols and diaphragm control valves. The drain lines and control valves to the condenser and the next lower pressure heater are both



FLOW DIAGRAM FOR BARRY STEAM PLANT.

sized for full flow, and the level-trols are staggered to afford an upper and a lower level range. The lower range is the normal operating range; therefore, the lower level-trol actuates the control valve to the next lower pressure heater.

Both control valves open with rising level; and at low turbine loads, the heater level will rise above the lower range since the differential pressure is not sufficient to discharge the condensate through the drain cooler although the control valve is full open. When the level reaches the upper range, the upper level-trol controls the valve in the drain to the condenser to maintain the proper level.

As the turbine load becomes greater and the pressure differential between the heaters increases, the heaters will drain simultaneously to the next lower pressure heater and to the condenser. This causes the level to fall (thus closing the drain to the condenser) to the lower or normal operating range where it is maintained by the lower level-trol, and the drain is to the next lower pressure heater.

The second low pressure heater drain has a by-pass which allows condensate to by-pass the drain cooler and drain to the first low pressure heater. The lower level-trol controls the drain cooler discharge or drain cooler by-pass. The throw-over between the controls is automatic and is actuated by a differential pressure switch located between the extractions to the two heaters.

The heaters are located above the turbine, and each extraction line is provided with a positive closing check valve. All check valves are actuated simultaneously from the turbine relay dump valve, and the check valves in the extraction to the closed heaters are tripped individually from high level in the corresponding heater. The check valves and all controls are air operated, and all valves controlling flashing mixtures have chrome-molybdenum bodies and stainless steel trim.

Starting System & Controls

The boiler may be brought up to pressure through the use of four mechanical atomizing oil burners which have a capacity of 150 gph of oil at 300 psi. The oil is supplied from three year type pumps located outside the boiler room and adjacent to a 100,000 gallon vertical oil storage tank.

The control room is designed for completely centralized control of the two generating units. All controls for station service switching, turbine, generator, and boiler are included in this room.

Most of the controls and some of the indicators are mounted on a benchboard. This arrangement locates more of the controls within easy reach of the operator and is low enough to afford practically full view of the indicators, recorders, and relays located on vertical panels behind the benchboards.

The benchboard is divided roughly into twelve sections: Station Service, Generator, Turbine, Air

Preheater, Master, Temperature, Feedwater, Fans, General, Coal, Gas (future), and Oil. Insofar as possible the controls on the benchboard are in alignment with their associated recorders and indicators on the vertical panels.

The control system is electronic-pneumatic. The control signals are electronic and air is used as the power medium to drive the dampers, hydraulic coupling scoop tubes, and other regulating devices. Steam flow is the primary control impulse and steam pressure is secondary, or finishing control impulse. A rheostat in the steam flow transmitter sends out an electronic signal proportional to steam flow which goes to the modulator for fuel control and to the air flow ratio subpanel where the steam-air or fuel-air ratio is established.

Air flow and furnace pressure are regulated by hydraulic coupling speed, but fan damper controls are also provided. An air foil section is installed in the air duct to the burners for air flow measurement.

Steam Temperature Control

The steam temperature control system is electronic with electric motor drives and is divided into two separate parts: primary steam and reheat steam.

The primary system temperature control is two-element with air flow as the anticipating element and steam temperature as the finishing element. Steam temperature is controlled by spraying feedwater into the piping between the two stages of the superheater.

The reheat steam temperature control is also two-element with air flow as the anticipating element and steam temperature as the finishing element. For reheat steam temperature control, there is one additional response element—burner tilt. The burners may be tilted up or down 30° and spray water, admitted into the cold reheat lines ahead of the reheater, is used only after the burners have reached their lowest position.

Two 15,000 gpm vertical, mixed flow priming pumps located in the

(*Continued on page* 104)

PRINCIPAL EQUIPMENT—Barry Steam Plant, Alabama Power Company

TURBINE-GENERATORS

Turbine-Generators .....Two—General Electric Company, 125,000 kw, 3600 rpm, tandem compound, double flow 1800 psig, 1000 F with reheat to 1000 F turbines direct connected to 147,059 kva, 18,000 volt, three phase, 4717 amp hydrogen cooled generators

Main Exciters .....Three—General Electric Company, 400 kw, 1200 rpm, 375 volt generators driven by G-E 600 hp, 1200 rpm, 4160 volt motors

CONDENSING EQUIPMENT

Condensers .....Two—Foster Wheeler Corp., 87,000 sq ft, horizontal, cross-flow, two-pass, divided water box

Circulating Water Pumps.....Four—Foster Wheeler Corp., vertical 44,500 gpm, with Westinghouse Electric Corp. 450 hp, 450 rpm, 4160 volt motor drives

Condensate Pumps .....Four—Foster Wheeler Corp., 1500 gpm, horizontal, four stage, 475 ft TDH with Westinghouse Electric Corp. 250 hp, 1200 rpm, 4160 volt motor drives

Air Removal Equipment.....Three — Worthington Corporation, V-type, duplex vacuum pumps with relief valves and Maxim silencers

STEAM GENERATING EQUIPMENT

Boilers .....Two — Combustion Engineering, Inc., 900,000 lb/hr at 1575 psig and 1000 F total temperature, single drum, direct fired, radiant type

Superheaters .....Two — Combustion Engineering, Inc. (Elesco), two-stage, 50,850 sq ft low temperature section continuous loop, high temperature section pendant type, temperature control range 450,000 to 900,000 lb/hr

Reheaters .....Two — Combustion Engineering, Inc. (Elesco), pendant type 20,200 sq ft; temperature control range 540,000 to 800,000 lb/hr

Furnaces .....Two — Combustion Engineering, Inc., water cooled, fin type roof tubes, water wall surface 44,720 sq ft

Ash Hoppers .....Two — Allen - Sherman - Hoff Co. flooded type, with water jets and sluice ways

Fly Ash and Tramp Iron Handling System....Two—Allen-Sherman-Hoff Co. 4 in. Ashcolite pipe, valves, fittings, hydrovactor, detraining tanks, and sequential controls for dust valves

Ash Pumps .....Two — Allen - Sherman - Hoff Co. 1950 gpm discharging through 1280 ft of 8 in. pipe against a static head of 20 ft

Ash Sluice Water Pumps.....Two—Ingersoll-Rand 1600 gpm, NTDH 210 ft

Air Heaters .....Four—Air Preheater Corp. regenerative, 102,100 sq ft, 976,000 lb/hr, inlet air temperature 100 F, outlet air temperature 575 F

Economizers .....Two — Combustion Engineering, Inc. (Elesco), continuous loop, split type, finned tubes, 25,600 sq ft surface

Pulverizers .....Eight — Combustion Engineering, Inc. (Raymond), bowl mills with integral exhausters and variable speed feeders, capacity 33,000 lb/hr

Burners .....Thirty-two—Diamond Power Specialty Co., steam, automatic operation

Soot Blowers .....Two complete sets — Diamond Power Specialty Co., steam, automatic operation.

Safety Valves .....Manning, Maxwell and Moore (Consolidated)

Automatic Relief Valves.....Four—Foster Engineering Co.

Blow-off Valves .....Yarnall-Waring Company, unit tandem type.

Blow-off Tanks .....One—Snyder Tank Company, 4 ft O.D.

Fly Ash Precipitators.....Four—Western Precipitator Corp., two-unit, multiclone, 552,000 cfm capacity

Combustion Controls .....Two—Republic Flow Meters Co., penumatic-electronic

Superheat and Reheat Temperature Control..... Two—Leeds and Northrup, automatic

Chemical Feed Pumps.....Four — Proportioneers, Inc. — two 16.46 gpm and two 1.09 gpm

Lighter Oil Pumps.....Three—Schutte and Koerting Co., herringbone gear, 15 gpm, 300 psi

DRAFT EQUIPMENT

Chimney .....One—M. W. Kellogg Co., concrete, 20 ft I.D. by 200 ft

Smoke Breeching and Air Ducts..Butler Manufacturing Company

Induced Draft Fans.....Four — American Blower Corp (Sirocco) 276,000 cfm at 260 F and 18.2 in. of water s.p. with Westinghouse 1000 hp, 720 rpm, 3160 volt motor drives

Forced Draft Fans.....Four — American Blower Corp., 195,000 cfm at 140 F and 11.9 in. water s.p., with Westinghouse 450 hp, 400 rpm, 4160 volt motor drives

Hydraulic Couplings (I.D. and F.D. Fans).....Eight—American Blower Corp., scoop tube type with external coolers

Draft Controls .....Republic Flow Meters Corp., pneumatic-electronic

BOILER FEEDWATER EQUIPMENT

Boiler Feed Pumps.....Six—Pacific Pumps, Inc., 10 stage barrel type, 1100 gpm at 310 F, TDH 5840 ft with American Blower Corp. Gyrol boiler feed pump fluid drives, internal coolers, Kingsbury thrust bearings, and Westinghouse 1750 hp, 3600 rpm, 4160 volt motor drives

Closed Heaters .....Eight—Griscom-Russell Co., vertical, U-tube, two pass; two with 3045 sq ft, two with 2520 sq ft and integral drain coolers, two with 3543 sq ft and integral drain coolers, and two with 3962 sq ft and integral drain coolers.

Deaerating Heaters .....Two—Elliott Company, direct contact, spray type, 900,000 lb/hr capacity with connected 150,000 lb surge tank

Evaporator Deaerating Preheaters..Two—Elliott Company, direct contact, spray type, 40,075 lb/hr capacity

Evaporators .....Two—Griscom-Russell Co., horizontal, "Bentube," 1444 sq ft, 40,000 lb/hr capacity

Heater Drain Pumps.....Two — Worthington Corporation, two stage, 210 gpm at 155 F and 385 ft head

Evaporator Drain Pumps.....Three—Ingersoll-Rand Co., 90 gpm at 235 ft head

Heater Drain Controls.....Fisher Governor Co., diaphragm air operated through torque tube float chambers

Feedwater Controls .....Two—Republic Flow Meters Co., pneumatic-electronic, three element

FUEL HANDLING

Belt Conveyors .....Haworth Engineering & Mfg. Co., 42 in. and 48 in. belts, plate feeder, gravity type take-up, 850 tph

Vibrating Feeders .....Six — Jeffrey Manufacturing Co., 350 tph

Crushers .....Two — American Pulverizer Co., ring type, 220 rpm, 425 tph, with 250 hp, 720 rpm, 4160 volt motor drives

Car Shake-out .....Two—Hewitt-Robins, Inc.

Railroad Track Scales.....Fairbanks, Morse & Co., four sections, capacity 200 tons

Crushed Coal Scales.....Eight—Richardson Scale Co., automatic, 500 lb weigh hopper, 30 tph

Barge Unloader .....Heyl & Patterson, Inc., capacity 1200 tph

PIPING AND VALVES

Piping Contractor .....Grinnell Company, Inc.

Primary Steam Piping.....14 in. O.D. chrome-molybdenum forged and bored, 10.75 in. O.D. chrome-molybdenum rolled seamless

High Temperature Reheat Piping.22 in. O.D. chrome-molybdenum forged and bored, 14.156 in. O.D. chrome-molybdenum plate welded and forged and bored

General Service Valves.....The Chapman Valve Mfg. Co. and Stockham Valves & Fittings

High Pressure Small Valves.....Manning, Maxwell & Moore—weld bonnet; and Henry Vogt Machine Co., Inc.

Boiler Feed Shut-off and Check Valves....Edward Valves, Inc., 18 in. welded end

Positive Closing Check Valves.....The Chapman Valve Mfg. Co., tilting disc, air operated; and Atwood & Merrill Co., reverse current, air operated

Float Chambers and Floats.....Fisher Governor Co.

Pipe Covering Contractor.....The Aber Company, Inc.

Pipe Covering Material.....Union Asbestos & Rubber Co. (Unibestos) with aluminum covering on pipe 3 in. and larger

INSTRUMENTS

Control Boards .....Clement Electric Co.

Steam Flow Meters.....Four—Republic Flow Meters Co.

Boiler Spray Water Flow Meters..Four—Republic Flow Meters Co.

Condensate Flow Meters.....Four—Republic Flow Meters Co.

Feedwater Flow Meters.....Eight—Republic Flow Meters Co.

Draft Gauges .....Republic Flow Meters Co., diaphragm

Pressure Gauges, Indicating.....Manning, Maxwell & Moore, Inc. (Ashcroft)

Pressure Gauges, Recording.....Republic Flow Meters Co.

Vacuum Gauges, Recording.....The Foxboro Company

Mercury Columns .....Manning, Maxwell & Moore, Inc. (American)

Thermometers, Indicating .....Manning, Maxwell & Moore, Inc. (American)

Thermometers, Recording .....Leeds & Northrup Co.

Conductivity Recorders .....Leeds & Northrup Co.

CO_2 Recorders .....Leeds & Northrup Co.

Barometer .....Manning, Maxwell & Moore, Inc. (American), Mercury

ELECTRICAL EQUIPMENT

Switchyard Structure .....Alabama Power Company

Main Transformers .....Two — General Electric Co., 3-phase, 166,600 kva, 18,000 to 115,000 volts, forced oil—water cooled

Auxiliary Transformers .....Six—Westinghouse Electric Corp., one 3-phase, 115,000 to 4160 volts; two 3-phase, 18,000 to 4160 volts; and three 4160 to 575 volts

Oil Circuit Breakers.....Allis-Chalmers Mfg. Co.

Outdoor Disconnect Switches.....U.S.C.O. Power Equipment Co.

Direct Current Control Power.....Electric Storage Battery Co., storage battery, FMS-21, 800 amp/hr

Emergency a-c Generator .....One—United States Motor Corp., gasoline engine driven, 150 kw, 600 volts, 3 phase, 60 cycle

Battery Charger .....Electric Products Co., 15 kw, diverter pole, M-G set

Station Service Switchgear

4160 volts—Allis-Chalmers Mfg. Co., metal-clad, with type AM-250 air circuit breakers

575 volts—I-T-E Circuit Breaker Co., metal-clad, with types LG, KC, KB and KA air circuit breakers

208 volts—Westinghouse Electric Corp.

Motors .....Westinghouse Electric Corp.

Power and Control Cables.....Okonite Company

Lighting Equipment .....Pittsburgh Reflector Co.; Westinghouse Electric Corp.

Communication Equipment

PAX Switchboard— Automatic Electric Co.
PBX Switchboard—Kellogg Switchboard & Supply Co.
Public Address System—Gai-Tronics Corporation

SWITCHBOARD EQUIPMENT

Switchboard and Control Panels..Alabama Power Company, 16 panels; ammeters: Esterline Angus—recording; General Electric—indicating; volt-meters, synchroscope, frequency meter, relays, and voltage regulator (amplidyne), by General Electric

MISCELLANEOUS

Fire Pumps .....Two—One Hale Fire Pump Co. and one Worthington Corp.

Turbine Oil Coolers.....Four — Schutte & Koerting Co., 1045 sq ft

Turbine Oil Purifiers.....Two—S. F. Bowser & Co., capacity 1080 gph, storage capacity 975 gallons, with 15 gpm circulating pump

Cooling Water Pumps.....Three — Ingersoll-Rand Co., 2000 gpm, 120 ft NTDH

House Service Pumps.....Two — Ingersoll-Rand Co., 1750 gpm, 220 ft NTDH

Screen Wash Pumps.....One — Ingersoll-Rand Co., 1500 gpm, 220 ft NTDH

Traveling Water Screens.....Three—Chain Belt Co., 64,000 gpm

Air Compressors .....Three—Ingersoll-Rand Co., 12 in. x 11 in. straight line, single stage capacity, 304 cfm free air at 100 psi

Switchgear Fire Protection Equipment.....Pyrene-C-O-Two Fire Equipment Co.

Low Pressure Water Twin Strainers.....Eight—Elliott Company

Service Water Priming Pumps....Two—Economy Pumps, Inc., vertical, mixed flow, 15,000 gpm, 40 ft NTDH

Copper Expansion Joints.....Twelve—Zallea Brothers

Sump Pumps .....One—Goulds Pumps, Inc., duplex, capacity 750 gpm at 30 ft head

Surge Tanks .....Two—R. D. Cole Mfg. Co., one 60,000 gallon for raw water; one 30,000 gallon for domestic water supply

MISCELLANEOUS BUILDING EQUIPMENT

Generator Room Crane.....Whiting Corp., 200 ton capacity with 25 ton auxiliary lift

Boiler House Crane.....Milwaukee Crane & Service Co., 25 ton capacity

Structural Steel .....American Bridge Co., building—4525 tons; O'Neal Steel Works Co., coal handling—765 tons

Window Sash and Operators.....Michael Flynn Mfg. Co.

Doors—Hollow Metal .....Pioneer Fireproof Door Co.

Doors—Tubular Steel .....Richmond Fireproof Door Co.

Doors—Aluminum .....Martin Katz Corp.

Steel Rolling Door.....Kinnear Mfg. Co.

Corrugated Asbestos Siding.....Asbestos Engineering Co. — main building—80,000 sq ft; coal handling structure—40,000 sq ft

Steel Floor Grating.....Borden Metal Products Co., 78,000 sq ft

Passenger Elevator.....Otis Elevator Co.

Freight Elevator .....Bagby Elevator & Electric Co., platform lift

Stationary Vacuum System.....U. S. Hoffman Mach. Corp.

Heating and Air Conditioning.....The Hardy Corporation

Roof Ventilators .....Octagon Ventilator Co., fan type, 24-48 in. dia; 12-60 in. dia

This Method Provides Reliable Record of Tests and Improvements

What happened and why? American Enka knows the answer in its North Carolina and Tennessee plants.

By PHILIP H. KLINE
General Engineering Department
American Enka Corporation, Enka, N. C.

WHEN something new is tried in your plant, is a record made of it? "Oh yes," you say, "our men know that story," or "We won't forget the grief we had with that new-fangled process." But "our men" have a habit of moving on to other activities either within or without the company, and if anyone does know of the event, it is doubtful that they know the whys and why nots. Worse yet, many folks may not know of the activity at all and it is entirely possible that they might have contributed to it—or that they may later duplicate the effort.

As a producer of Rayon textile yarns in the 1930's, The American Enka Corporation had plenty of such problems. As we developed High-Tenacity, industrial and tire-cord yarn, we had other new developments, all in a single plant at Enka, North Carolina. In the late forties, we built our large modern plant in Lowland, Tennessee, and since that time have developed many types of specialty products, our latest being, "JET-SPUN," a solution-dyed yarn in attractive colors.

Record Form

Our growth and variety has brought forth a wealth of technical advances. Some of the engineering tests and improvements are now recorded on the form illustrated, as explained below.

We first started with a visible index card file (Kardex). And so long as we operated with a relatively small Plant Engineering Department, and had a methodical engineer looking after such things, the first system worked well. Information was handy, and the record was really used by design, operating and maintenance forces.

Now we have four engineering groups, each of which has one person responsible for maintaining and distributing information of this nature. Consequently a more appropriate system has been adopted. A reproducible record is started from notes relating to the origin of the test, and an ozalid print copy is forwarded to all interested parties. When a conclusion is reached, a final report is made on the same sheet, and the group which conducts the test maintains all samples, operating records, development notes, etc. A permanent master file of all ozalid prints is kept in the General Engineering Department as a company-wide record.

In order to keep up to date on the status of the tests, "Change Entries" are made from time to time. Examples of such changes are:

Results observed and remarks as to progress.

Revision of scope, interest or plans.

Completion date expected or changed.

Deferment notations and reasons.

If handled by other departments, their comments and activity.

Final report, conclusion and approval of the test report.

We have had occasion to refer to records made as far back as six to ten years ago. "Didn't we try that?" is a typical question at engineering conferences. At times we are called upon to report our experiences with a product or device which has a general application, but is not readily identified by trade name or supplier.

As our Director of Engineering, Mr. P. P. Kriek, points out, the record and procedure is of real value also in a negative sense, for it is important to know what does *not* work and why. Even though the conclusions are unfavorable we still want to avoid duplication of test and improvement investigations by advising all concerned of company-wide activities in each connection.

Among the wide range of records published to date are items of such typical variety as:

Seals and Packings.
Lubricants.
Coatings.
Motor performance.
Tubing and Valves.
Gears and Machine Parts.
Redesigned Accessories.
Corrosion and Pollution Problems.
Test Station Arrangements.
Plastic Materials.

As will be noted on the sample records shown, complete reference information is entered on the report form. The supplier's name and

the purchase order number are given so that the source and price of the material involved are readily obtainable.

When an item is approved for stock at one location, the warehouse number reference is valuable so that any prospective user can call for it and be assured of receiving the exact article tested.

The records are serially numbered so that a chronological and subject index will direct attention to the material covered by the procedure.

AMERICAN ENKA CORPORATION
Lowland ENKA DEPT.

ITEM SERIAL NO. L K- 21

TEST OR IMPROVEMENT RECORD SHEET NO. 1 OF 1

DESCRIPTION Plasti-Lube Grease # 1

A Bentone Grease - Oil content 91% Vis. 1800 - 2000 SSU @ 100°F

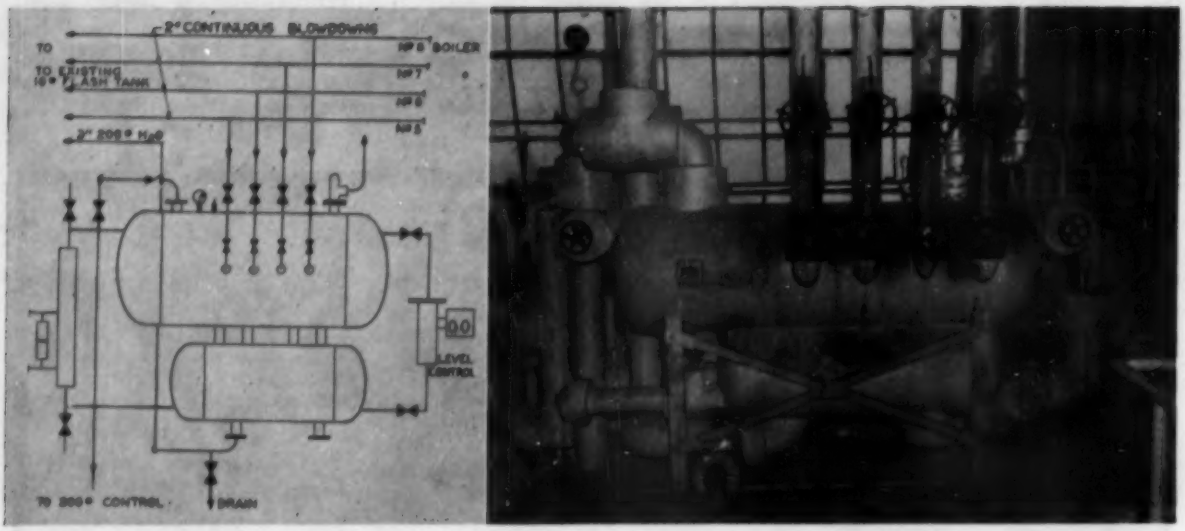
DATE	RECORD OF START AND ADVANCEMENT	BY
	STARTED BY Lubrication REFERRED TO Mechanical Maint.	
	REMARKS Bentone Grease - 91% Mineral Oil 1800 SSU @ 100°F.	
	LOCATION OR C.S. INTERESTED 7.23	
3/15/50	Requested sample of Plasti-Lube Grease from manufacturer	Hale
3/23/50	Sample received. Tests made of heat resistance and water absorption.	
	Found to be excellent in both respects. Grease retains consistency at	
	temperatures in excess of 500°F. Has no dropping point. Retains	
	lubricity in presence of water, absorbing large quantities without	
	losing adhesive characteristics.	Hale
6/2/50	Larger sample (25#) ordered for test in service. Tested on Slashers	
	Cylinder bearings and on Salt System screw conveyor. Performance	
	excellent.	Hale
7/27/50	Ordered for Warehouse Stock	
	Stock Number 43-006	Hale
	J. O. Bush	
	E. Vahsdal	
	F. M. Pratt	

APPROVALS:

REFERENCES
Purchase Order TL-4602
Manufacturer Warren Chemical & Refining Co.
Letter or Memo
Machine
Drawing
Catalog

OTHER

COPIES TO: Director of Process; Records Supervisor, Enka Plant Engr., Asst. C. Leader, Research Engr. Section, Engineering Aide, Gen. Engr. Dept.



High pressure continuous blowdown flash tank used to increase capacity of inadequate boiler blowdown system.

Stage Flash Tank Saves for Texas Plant

REVISED BLOWDOWN SYSTEM

Problem:

Our existing blowdown system was too small to allow capacity operation of boilers with the high makeup and poor quantity feed water in use. Further complicating matters was the entrainment of water in the flash tank vent on the roof of the power house.

Solution:

A stage flash tank was installed to operate at one of the process steam pressures as is shown in the sketch.

Existing equipment consisted of four boilers with a maximum continuous blowdown of 120,000 lb/hr of 600 psi steam, a 10 psi flash tank, blowdown heat exchanger, and feedwater heaters at 70 and 200 psi. It was decided to install an intermediate stage flash tank in the system to operate at 200 psi, flashing the remaining liquid to the existing 10 psi flash tank. This pressure was chosen because of the need for additional 200 psi process steam.

The flash tank of horizontal design, due to space requirements, was fabricated in company shops of 24" OD x 9/16" x 75" steel pipe with 24" extra strong weld caps for ends. The water box was similarly fabricated of 18" OD x 9/16" x 51" steel pipe with weld caps for ends.

The tank was placed in service over two years ago with the gratifying result of lost heat recovered, reduced steam velocity to 10 psi deaerator tending to decrease carryover, and the elimination of the water entrainment in the vents.

A comparison of the two systems is tabulated.

At the normal BD rate of 60,000 lb/hr the installation recovered $1,130 worth of 200 psi steam per month which amortized the installation cost in a few months.

By R. M. CASWELL, Asst. Department Head, No. 2 Steam & Power Plant, Carbide and Carbon Chemicals Company, Texas City, Texas.

Comparison of the Two Systems

	600 to 10 psi	600 to 200 to 10 psi
Total Quantity	1000 lb.	1000 lb.
200 psi steam produced	... lb.	131 lb.
Heat avail. from 200 psi steam	... M Btu	157 M Btu
Heat in liquid	... M Btu	315 M Btu
10 psi steam produced	276 lb.	126 lb.
Heat avail. from 10 psi steam	321 M Btu	169 M Btu
Water to HX	724 lb.	743 lb.
Heat to HX	150 M Btu	154 M Btu

Reduction in 10 psi steam produced 54.5%
Reduction in feed to 10 psi tank 13.1%

Unique Texas Installation
Cuts Costs of Sulphur Mining

Portable Power and Heating Plant

By A. J. COHEN
Project Engineer
H. E. Bovay, Jr., Consulting Eng.
Houston, Texas

A NEW type "portable sulphur mining plant" conceived and designed by H. E. Bovay, Jr., Consulting Engineers, makes it possible for sulphur deposits, heretofore considered too small for commercial production, to be developed.

This Standard Sulphur Company installation, located on Damon Mound, near Rosenberg, Texas, is the first plant of this design. The entire installation including the water treating plant, power plant, relay station, and molten sulphur plant, is a portable skid mounted unit comprising a semi-outdoor installation consolidated in a space of 100 feet square.

Power Equipment

The facilities for the plant proper include a hot process water treating plant, composed of a lime house, two softeners, one lime mixing tank and three anthracite bed filters; two 500 hp modified scotch marine type automatically controlled boilers; two centrifugal mine pumps, one gas engine driven and one with steam turbine drive; two direct gas fired mine water heaters; two 125 kva gas driven electric generators; one steam driven air compressor; and one complete relay station with connections for four sulphur wells.

Supplementary auxiliary equipment includes two raw water pumps, one gas engine driven and one electric; and one electric driven sulphur pump in the molten sulphur pan.

Unique Feature

The fundamental departure from established sulphur plant design is the use of the direct fired heaters for heating the mine water, instead of the usual elevated steam heaters. This application simplified plant operation and with proper instrumentation the plant proper can be operated with only four men for each watch. As proof of the simplicity, the technical staff of the Bovay organization was able to bring the plant on stream and familiarize inexperienced operators with their duties in less than two weeks.

Portability

Among the unique advantages of this unit, when compared to existing installations are its portability and diversification. Not counting the foundations and site preparation, the plant proper can be dismantled and moved to a new location in approximately 30 days and at a cost of less than $50,000. The only portions of the plant lost when such a move is made is approximately $35,000 worth of foundations, the major portions of which are underreamed type footings; fuel supply lines; and raw water supply.

This is especially significant for small sulphur deposits generally found in scattered pockets around the edges of a salt dome because it becomes more economical to move the plant than to install and maintain air and insulated steam, water and sulphur lines overland to the well heads.

Even for large sulphur deposits, this costly overland piping can be

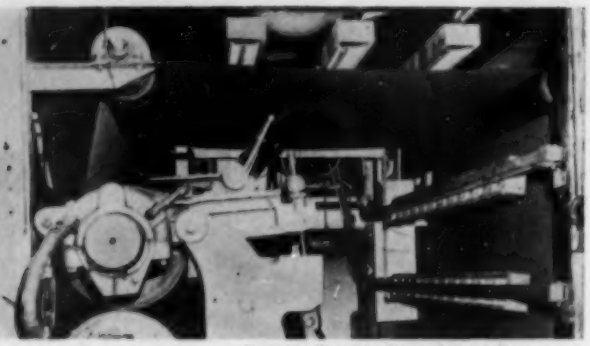
(*Continued on page* 103)

Two hot process softeners with steam deaerators are in background; immediately forward are the boilers, and next, mine heaters. The firing aisle is covered by a slat roof; gabled roof with portable sides houses the mine pumps, electric generators, switch gear, and air compressor, with relay stations at the right hand end. Raw water settling tank and air receivers are to the right of softeners and behind the relay stations. Pipe Line to the right goes to the wells and back through the relay station to the sulphur vat in the foreground. Two wells are in operation.

Many Types, Many Uses

Courtesy Red Ray Manufacturing Co., Inc.

Burners installed between press and first dryer on paper machine.



Courtesy Footoria Pressed Steel Corp.

Oven for baking enamel on stove parts. It is a one coat bake.

Knowledge and Experience Needed in

Selecting Radiant Heating Equipment

By FRANCIS A. WESTBROOK

Radiant Heating is not magic. Equipment must be properly selected, and correctly installed in the right place.

INDUSTRIAL applications of infra - red radiant heat have been increasing rapidly since the equipment has been improved and the methods of using it have become better understood. There are plenty of instances where almost dramatic success has been achieved, but others where the failure has been dismal.

The reasons for this become apparent when it is considered that there are two practicable sources of infra-red, or radiant, heat: gas and electric. Furthermore, there are at least three different methods of employing the latter. Also, it is essential that the units be installed properly. In other words unless infra-red heating is understood and the right method of applying it is used for a given set of conditions success of failure becomes purely accidental.

Infra-red heating units transfer heat by radiation, which means that only materials capable of absorbing the radiation experience a rise in temperature when exposed to it. This may be well illustrated by exposing a piece of metal to the sun rays which heat by radiation. The metal quickly becomes much warmer than the surrounding air, because the metal readily absorbs the sun's radiation and the air absorbs very little.

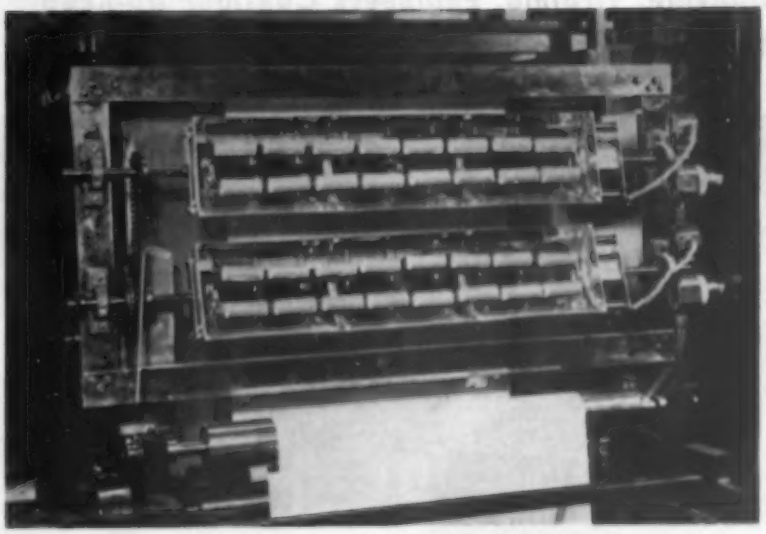
Thus heating by radiation is entirely different from heating by convection. With the latter the air is first heated and this circulates, or is circulated by a fan, to heat the objects with which it comes in contact, as in an oven. Thus within certain limitations the faster the air is circulated the faster the convection transfer of heat. But with radiant heating circulation of the air is relatively meaningless, except where a drying operation is involved and it is necessary to remove the moisture or fumes which the heat evaporates.

Another valuable feature of infra-red heating is that the radiation is reflected with 98% efficiency by specular gold reflectors. Consequently when such reflectors are used the surroundings are not heated and it is not necessary to insulate the walls of enclosures where radiant heat is employed, as is usually necessary where conduction of convection heating ovens are used. Obviously there is less waste of heat in radiant installations, and in many instances better working conditions can be maintained.

Radiant heating is also very

much faster than heating by convection since objects exposed to radiation and capable of absorbing it, immediately begin getting hotter than the surroundings. Consequently infra-red heating is very effective in connection with much of the modern high speed processing equipment.

For instance a motor car body can be painted and dried in an hour when infra-red heating is employed. Printing ink in the fastest presses can be dried almost instantly and in the textile field drying in various finishing operations can be greatly expedited. This is particularly true in the printing and processing of some of the new synthetics.



Courtesy The J. E. Doyle Co.

Open glow electric dryer, with the heat off, showing the units turned away from the material.

Types of Units

There are three different types of electrical infra-red heating units and each has its particular field of application.

Filament Lamps

First there are the glass enclosed filament lamps. They are designed to give off a maximum of infra-red radiation and produce much less light than conventional filament lamps. They come up to full heat almost instantly and, when switched off, cool almost as quickly. However the temperature at which these lamps can be operated is limited by the melting point of the glass. This makes them unsuitable for the quick flash drying of materials in high speed machines, such as modern printing presses, for example.

A typical use for filament lamps in the graphic arts field is in the drying of varnish on paper labels where the latter, in sheets, are placed on a conveyor which travels under a bank of lamps, and are dried in 3 seconds. When gas or steam heated ovens are used the labels need 15 seconds in the oven, followed by 30 seconds in the air to be properly dried, and twice as much space is required.

In textile drying the lamps are frequently used as an adjunct to existing steam heated drying equipment. They can often be installed on such equipment without making any other changes and at relatively low cost—making it possible to run the cloth so much faster that the output is increased 25 to 50%.

Open Glow Unit

The second type of infra-red radiant heating is the open glow unit. These units consist of coils wound on refractory cores which become incandescent and heat up very quickly, and cool off very quickly. Each unit is about 1½ inches in diameter and 3½ inches long, and they are placed end to end in double rows to form a complete heater. When installed in a printing press or textile dryer the length of the heater is equal to the maximum width of the web of paper or cloth which the machine is designed to handle. They generate a temperature of about 1230 F at the heater and about 800 F at 2 inches away.

This heater is suitable for use where a high heat is required for a very short time on very fast machines. With this type it is possible to control the degree of heat and the length of time during which it is applied, which may be very important and which is not always practicable with equal accuracy with other methods of drying. For instance in the drying of textiles, which are more or less absorbent, the objective is sometimes, if not usually, to dry the surface thoroughly but leave the natural moisture content in the body of the material.

A high heat applied for a very short time can often accomplish this result whereas a lower heat applied long enough to dry the surface might very likely dry out the whole of the material to an undesirable extent. The same reasoning also applies to the drying of ink on paper.

Thus there is a very definite relationship between time and temperature to realize a desired result, and the open glow units provide the best known means toward this end.

Automatic controls can be used with open glow heaters which are very effective when applied to certain kinds of drying equipment. In textile processing and in the graphic arts the units are so wired that when the machine is stopped the heaters are automatically switched off and turned away so that the material will not be scorched or damaged. They are also automatically energized and turned back to the operating position when the machine is started.

In addition to this, extra heating units may be installed which are automatically energized when the speed of the machine is increased beyond a pre-determined point.

(Continued on page 102)

Danville, Virginia, Engineers Consider Up-Keep When Selecting and Arranging Equipment

Aerial view of Dan River Mills' Schoolfield operations, Danville, Va.

Electrical Equipment Designed for Minimum Maintenance

Engineers at Dan River Mills, Inc., believe the way to save maintenance money is to buy correct material and equipment, and to install it so that from the outset and for the life of the installation, maintenance expenditures will be at an absolute minimum.

By WILLIAM H. BEERS
Chief Plant Engineer
and JOHN R. TORRENCE
Electrical Engineer
Dan River Mills, Inc.
Danville, Va.

WE ATTEMPT to design and set up new electrical equipment so it will operate satisfactorily with minimum maintenance. We will discuss here the difficulties and successes of our program.

Types of Motors

Most plants use screenless open motors of the so-called textile type, but we do not feel they are ideal for cotton mills. Lint that collects on walls, ceilings and equipment in a cotton mill precipitates frequent flash fires. Even a small spark may cause a fire, and when a sprinkler head goes off (sometimes even accidentally without a fire), the screenless open type motor becomes water soaked, and must be baked or rewound.

To eliminate the frequent expense of baking or rewinding we choose a totally enclosed fan-cooled motor that will pass lint through the fan. However, these are not available except in a few specific sizes.

Generally speaking, our need is for sizes above 3 hp and up to 150 hp. In 3 hp and below, we can obtain totally enclosed non-ventilated motors. For sizes above 3 hp, we have adapted a standard totally enclosed fan-cooled motor for linty conditions. Although this adaptation is not completely satisfactory, the motor is doing a much better job than we previously experienced with screenless open motors.

We also want to protect controls, switches and starters from lint but

manufacturers do not furnish a complete line of controls at reasonable prices with such protection. We are able to buy dust type NEMA-V switches, but find them quite expensive. There is an enclosure for starters and NEMA-IA switches, but these are limited in the variety of types. We would like to see the rest of the line available in NEMA-IA.

Most plants appear to be reconciled to the higher maintenance that comes with cheaper types of motors and controls. This, we believe, is because not enough publicity has been given to the advantages of the better type installation. However, we know that we are not alone in this type of thinking. Some other plant engineers feel the same way we do, and we believe the majority of mills will eventually come around to adopting our point of view. Then demand will influence electrical manufacturers to offer needed lines of motors and control equipment at reasonable prices.

We look forward to the day when the manufacturers of textile equipment will include lint tight motors and controls on their equipment without buyers having to prepare special specifications as we have to do at present.

Motor Leads

For motor leads, we use flexible cables of neoprene or plastic insulation which make a solid cable.

In the past, a flexible metal conduit was used through which the wires were pulled; but a fire at one point would travel down the flexible metal conduit and start a fire at the other end. We have had occasions where this resulted in the complete destruction of loom warps, causing loss amounting to hundreds of dollars.

The neoprene or plastic cable is installed at no increase in cost over the previous installation. This improvement has not only completely eliminated the above mentioned fire hazard but has proven more reliable from a mechanical standpoint, for it was hard to keep the end of the flexible metal conduit from breaking loose.

Lighting

Some years ago when fluorescent lighting was new, we installed individual fixtures to give proper light intensity, and hung the fixtures from cable or conduit. This arrangement proved inflexible. When an operation changed within a room, we generally had to rearrange the fixtures. If additional intensity was required, complete fixtures had to be added.

We now install a continuous channel along the ceiling, and every 8 ft along the channel is a 4 ft fluorescent fixture equipped with a three-tube socket and two-tube ballast. This arrangement of fixtures provides complete flexibility and makes it easy to provide greater or lesser intensity as required at any point. If a third tube is required in any fixture, additional ballast is added within the channel. Very little lint accumulates on the continuous channel.

Where extreme lint conditions exist, we use a fixture that is totally enclosed with a glass panel on the underside of tubes or lamps. This type of fixture practically never requires cleaning. However, because of its higher cost, it is only used in extremely linty areas.

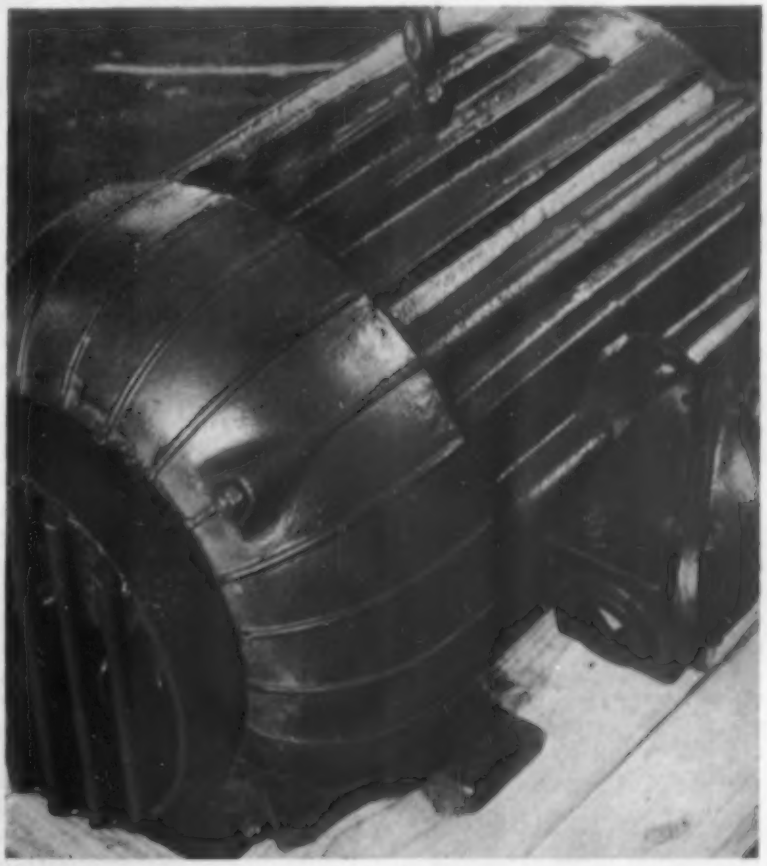
In the interest of facilitating maintenance, we locate dry type lighting transformers as close to a panel as possible. Plenty of open circuits are made available so that additional lighting can be added.

Improvements Studied

Every time a new addition is made to our power distribution system, a study is made from the standpoint of maintenance. Considerations include: sufficient space to work in, ease of access to and removal of items of equipment, and the installation of devices within the structure so that maintenance men can readily lift and transport heavy items of equipment. All junction boxes are made large and roomy. Insulated bushings are used throughout and the best pressure type lugs, connectors, tapes, etc., are used.

(*Continued on page* 101)

Enclosed fan-cooled motors protected in linty locations.



Steam Kills Bacteria in North Carolina Air Conditioning Unit

Controlling Bacteria In Air-Wash Tank

By SAM BOYER
Wisteria Hosiery Mills, Inc.
Gastonia, North Carolina

WE WERE having considerable trouble in the dehumidifier of our 100 ton air conditioning system at Wisteria Hosiery Mills, Inc., in Gastonia, N. C., due to spore-forming bacteria building up a heavy concentration in the 1400 gallon air-wash tank. This concentration of bacteria, which was at first believed to be algae, proved resistant to chemical treatment. It presented a serious problem when the accumulation grew so rapidly that it completely blocked the flow of water through the screens several times daily, thereby stopping the supply to the Buffalo pump. The pump is driven by a 15 hp motor operating at 1750 rpm, and has 100 ft head. It delivers 400 gpm to the two sets of opposed spray banks.

The bacteria manifests itself in the form of a grayish sludge, and makes the most rapid growth on the baffles closest to the surface of the water. This is illustrated by the heavy concentration of bacteria shown in **Photograph No. 1**, and appears on the lower end of the baffles. The illustration is from the back end of the dehumidifier, closest to the fan. The Buffalo single inlet fan operates at 421 rpm and delivers 41,800 cfm to the conditioned space. It is driven by a 20 hp, 1750 rpm motor.

We tried several different chemical treatments, which all seemed to be effective for a week or more. After that time the chemicals were absolutely ineffective as far as control of the bacteria was concerned.

We later learned from a firm of chemical research specialists that the fungus growth was not algae, but was of a spore-forming type of bacteria of the mold family. When chemicals were applied to kill it, the bacteria formed a spore around itself to become resistant to the applied chemicals. That was the reason that treatment was not effective after a short period of time.

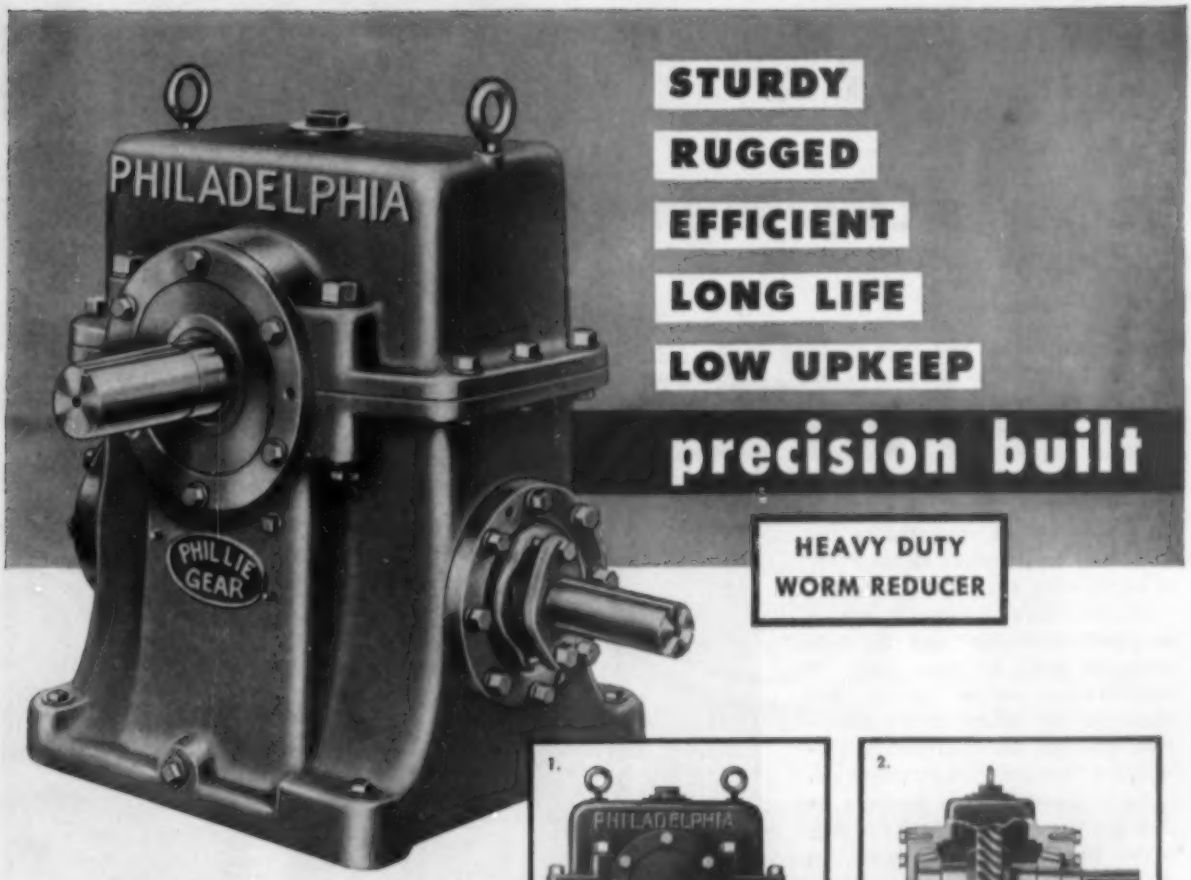
Steam Does the Job

After a great amount of experimenting over a period of several years, during which time we spent a considerable amount of money on chemicals, we finally solved our problem in a simple and very inexpensive manner.

We obtained a 25 ft length of Goodyear ¾", 4-ply steam hose, which is rated at 100 pounds test pressure. We next obtained a Jenkins ½" quick-opening gate valve. The valve was connected to the steam hose through a short nipple, a 45 degree elbow, and a short piece of ½" pipe threaded on one end only. The smooth end was inserted in the steam hose for a very tight fit. The leading end of the gate valve was reduced to ⅜" pipe, and 32" length of pipe was screwed into the reducer; this made the cleaning device shown in **Photograph No. 2.**

The air conditioning system

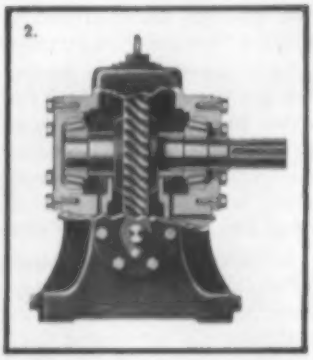
(*Continued on page* 100)



STURDY
RUGGED
EFFICIENT
LONG LIFE
LOW UPKEEP

precision built

HEAVY DUTY WORM REDUCER



1. Heavy Duty, Type "AT" Reducer, showing the rugged worm and shaft construction; generous ball bearing mountings, and the easy-to-get-at, leak-proof stuffing box.

2. Same Reducer, showing section through worm wheel shaft. Note generous spread of roller bearings, and efficient design of oil wells surrounding bearings.

. . . and we really mean "Precision Built,". . . in fact, we have put as much research, design and skill into these heavy duty reducers, as is put into the finest time-pieces or scientific instruments.

In order to assure the user of Long, Efficient Service Life with lowest possible maintenance, materials and manufacturing standards are very rigidly maintained at "Phillie Gear":

Worms are of alloy steel with carburized hardened and tempered threads; shafts and threads are precision ground and polished after heat-treating.

Worm Gears are made from highest quality chilled-cast nickel bronze.

Housings are oil-tight quality grey iron . . . designed to assure maximum rigidity and heat radiation, with ample oil reservoir.

Units are available with Worms above or below the Worm Gear; also with shafts up or down for Vertical Drives.

A complete range of sizes is available to cover any application up to 265 H.P., with ratios from 3-5/8:1 to 6300:1. They are built to provide efficient and dependable power transmission under the most rigorous conditions over a long period of time.

For detailed information write for latest catalog WG.

SERVING SOUTHERN INDUSTRY from LYNCHBURG, VA.

For catalogs or detailed information, write Virginia Gear and Machinery Corp., Lynchburg, Va. or the address below

PHILADELPHIA GEAR WORKS, INC.

Industrial Gears & Speed Reducers

LimiTorque Valve Controls

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Accidents Prevented at Florida Power & Light Co.

Employee Cooperation is Key to Safety Program

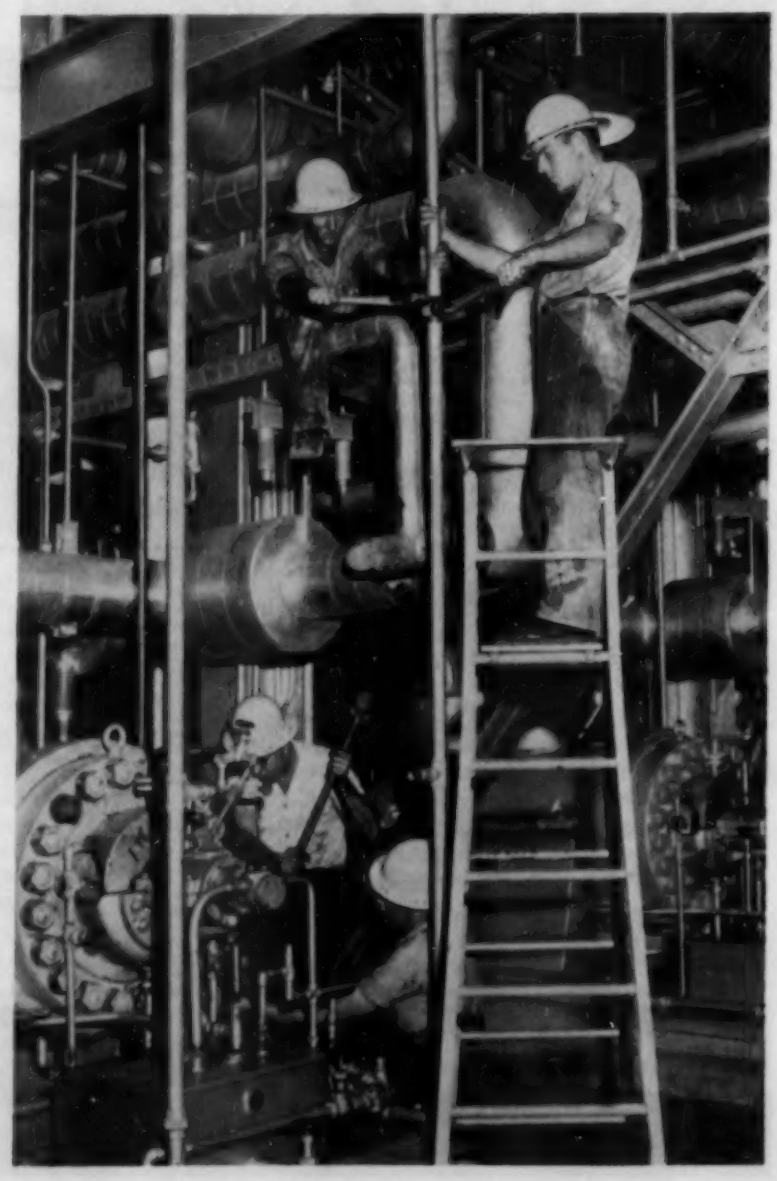
RAISING safety to a level equal in importance to production has netted favorable results for Florida Power & Light Company of Miami, Florida. Also, employee cooperation is an important element in the company's safety program. Measures encouraging individual responsibility at all levels of supervision are proving valuable.

Florida Power & Light Company supplies electricity (and in some instances gas) to large areas of southern and central Florida. Because of the nature of its activities, the firm has consistently promoted a "working" safety program.

Each supervisor or foreman is charged with the safety of the men under him to the same extent he is held accountable for their work. Recognition of this dual responsibility encourages a genuinely responsible attitude among crewmen.

Although workers are not compelled to wear safety hats, company management makes certain that adequate hats and other safety equipment are available. The availability of the hat and the obvious protection it affords, plus promotion of "safety consciousness" among the employees, has resulted in the hat being extensively accepted and worn.

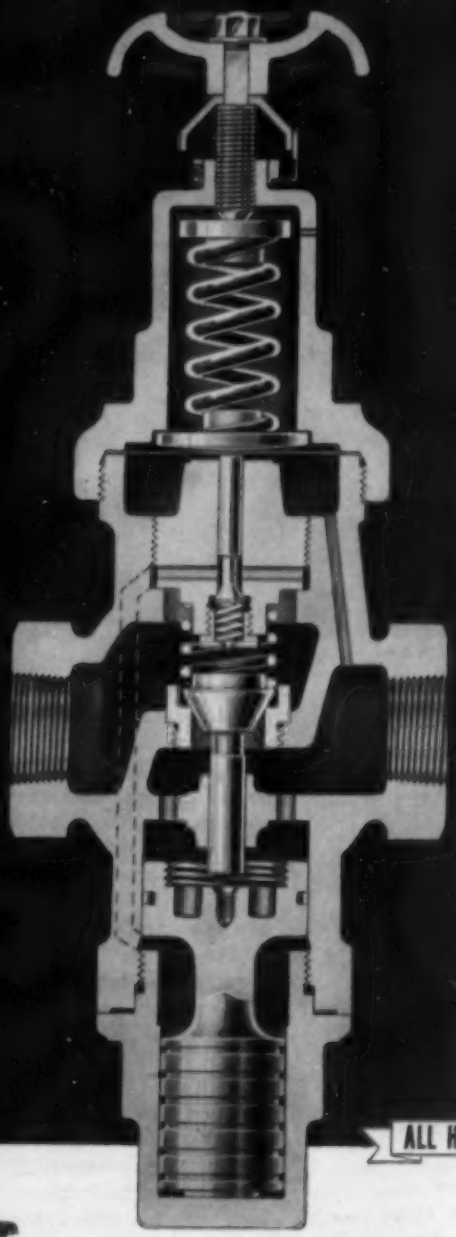
The personal experience of individual crew members is of course an important factor in keeping the "percentage of use" on the rise. Nearly every crew encounters its share of hazards and nearly every crew member can recall an incident where the safety hat proved the margin of difference between a mere incident and possible serious harm to some member of the crew.



Close contact of teams working with wrenches and sledges at different levels sets the stage for possible accidents. Protecting Florida Power & Light Company employees against head injury in such situations are the safety helmets which they are wearing. The MSA Shockgard helmet manufactured by Mine Safety Appliances Company is molded of tough one-piece plastic. Shatter-proof and impact-resistant, the hat is designed to protect against falling objects as well as contact with high voltage lines.

MASONEILAN No. 11

FOR STEAM



More

Sensitive Response

Users report this Masoneilan No. 11 is the most accurate, dependable Pilot Operated Steam Pressure Reducing Valve they've ever used. Superfinished stainless-steel pilot valve, housing, and main valve practically eliminate sticking or corrosion.

Less Maintenance Expense

Service records show maintenance usually consists of little more than keeping the moving parts clean. All parts may be removed and replaced with the valve in the line. A wider range of reduced pressure settings . . . and an unusually sturdy construction — make it the finest, most economical valve in its class.

Available for initial pressures up to 250 psi. Sizes ½" to 2" in bronze; 2½" to 4" iron; or ½" to 3" steel. For more information, write Mason-Neilan Regulator Company, 1206 Adams Street, Boston 24, Mass.

ALL HIGH Quality Control PRODUCTS

No. 11 for steam No. 71 for air No. 227 for water No. 33 for steam, air

MASONEILAN REGULATORS

Keep Pressure Under Control!

Order from your Mason-Neilan Distributor.
Use his experience.
Save work, save time.

For the "Man-With-a-Brush"

Texas City Industrial Painter's School

By B. C. WRIGHT
Maintenance Engineer,
Carbide and Carbon Chemicals Company,
Texas City, Texas

DUE to the many new developments in the coating industry in the last few years, the great majority of painters have not had an opportunity to keep abreast their trade. This lack of knowledge has resulted in the dramatic failure of many excellent paint systems.

Any hint of schooling after work hours, by industry, usually brings a quick demand from organized labor for overtime pay. Since it has become accepted practice to contract much repainting, as well as all new construction painting, it is impractical and too expensive for one company to train the painters on their jobs today, for tomorrow they may be across the street working for another company. From this line of thought we progressed to the idea of making available a free school, open to all people interested in industrial painting in the area.

Our first step in organizing the school was to discuss with the AF of L Business Agent—who represents approximately 90% of the painters in the area—his feelings on the matter, and ask him for suggestions and support. He was very enthusiastic and promised the full support of the Union. His estimate of expected attendance to the school was from fifty to seventy-five men.

Next we discussed the matter with our paint contractors and were pledged their whole-hearted support.

Our third step was to contact another large chemical plant in the area, they agreed with the idea and we received their full cooperation. Between the two companies we set a date for an organizational meeting. We contacted as many people and companies as we could think of who would be actively interested.

Shop Level Program

More than forty-eight people attended the organizational meeting. These were from Organized Labor, Suppliers, Equipment Companies, Manufacturers, Contractors and Industry. These men agreed with the idea of a school and pledged their support.

It was agreed that it would be a training program and not a series of sales meetings, and that all talks, demonstrations and films would be directed towards the MAN WITH THE BRUSH and would not be intended for engineers and foremen. As well as could be determined this was the first time such a joint endeavor had been attempted. Each group elected a member and an alternate to serve on a joint planning committee that was to meet and plan the details of the school.

At the planning meeting the Union asked that fundamentals be included as well as new developments, and this was heartily accepted by the rest of the committee. We listed fourteen topics we believed should be covered, and then decided that the school should be limited to eight meetings of two hours. A schedule was prepared and assignments of subjects to be covered was made. Each sponsoring group was to present one or more of the programs, but the bulk of the instruction was to be done by the suppliers. A contractor with a warehouse located on his property volunteered its use as a meeting place.

The actual average attendance for the eight meetings was between 150 and 175 painters. In general the programs were well presented and were non-commercial in nature. Speakers came from as far away as California and Pennsylvania to present programs. Actual demonstrations proved to be of the greatest interest, with movies and slides running a close second.

The painters were a most attentive audience and asked some questions. Both Union and non-Union men attended and the AF of L kept

(*Continued on page* 100)

CLASS SCHEDULE

1st Meeting

Surface Preparation

A. Chemical Surface Preparation
B. Power Tools—Buffers and Chippers
C. Sandblast

2nd Meeting

Application Equipment

A. Brush
B. Roller
C. Spray

3rd Meeting

Primers in general and their application.

4th Meeting

Use and application of Vinyl paints, Vinyl mastics and Epoxy paints.

5th Meeting

Use and application of Neoprene protections and Chlorinated Rubber paints.

6th Meeting

Use and application of Alykd paints, cold galvanizing processes and Phenolic coatings (Baked, Catalyzed and Modified).

7th Meeting

Hot application of paint, and the use and application of mastics, both cold and hot.

8th Meeting

Safety, Inspection and Costs.

• Some of the 189 YARWAY Gun-Pakt expansion joints installed at large oil refinery in Texas.

No fatigue with 189 YARWAY GUN-PAKT EXPANSION JOINTS at this large Texas refinery

THEY just work and work for years and never get tired. Yarway Gun-Pakt slip-type joints simply will not fail through fatigue. They will operate smoothly, as frequently as required, over long, full traverse up to 12" single type or 24" double type or short, partial traverse, day in and day out—with never any danger of metal fatigue or failure.

This is just one of the many big advantages found in Yarway Gun-Pakt expansion joints. Other outstanding Gun-Pakt features are:

1. Can be serviced under *full* steam pressure day and night, thus avoiding costly and inconvenient shutdowns.
2. Fixed Gun-Pakt gland serves as "built in" external guide and permits less costly and rigid pipe guidance than required by many other types of joints.
3. Lower pressure load on end anchors because excessive strains are eliminated.

Used for many years with success in well-known refineries, industrial plants, utilities and institutions. When replacing present joints or planning new steam lines, it will pay you to look into the advantages of the Yarway Gun-Pakt expansion joint. Write for Yarway Bulletin EJ-1913.

YARNALL-WARING COMPANY
Home Office: 116 Mermaid Ave., Philadelphia 18, Pa.
Southern Representative:
ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

YARWAY

gun-pakt expansion joints

HELPING the *MAN-IN-THE-PLANT*

Ideas..Methods..Gadgets

Protect Your Turbines Against Water Damage

MANY industrial plants generate their own power. When a turbo-generator is used and steam is supplied by boilers without proper steam drying and purification equipment, there is always danger of damage to turbine blading by entrained moisture or water.

This is also true when turbines are used for auxiliary drives or to drive production equipment. The water need not always carry over from the boiler but may collect in low spots in the steam line due to condensation at light loads. When the load is suddenly increased this condensate may be picked up, due to increased velocity of steam flow, and carried into the turbine. If there is any appreciable amount of water, damage is sure to result.

The accompanying pictures illustrate such damage to a 1500 kw generating unit.

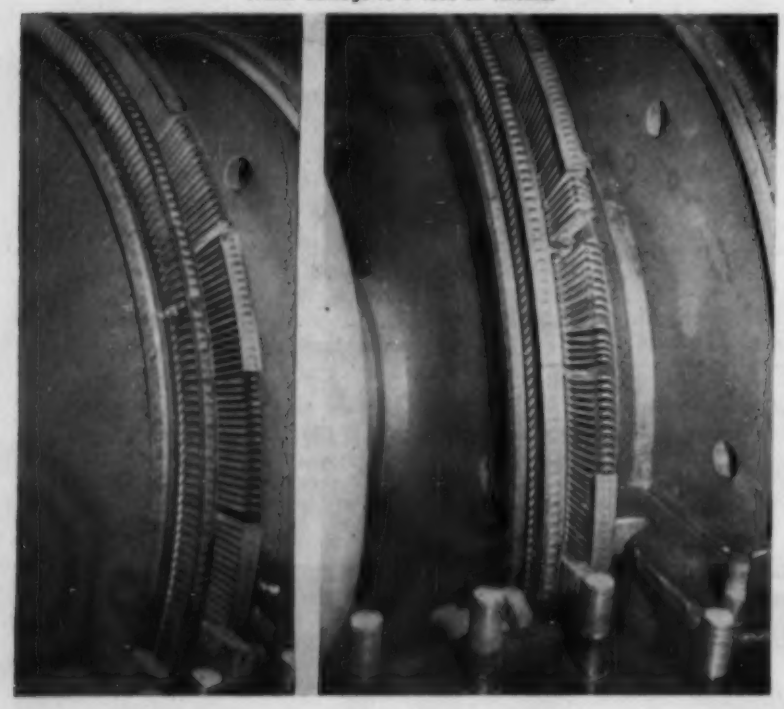
The damage shown in the photo occurred several years ago due to a series of events which might occur in any medium or low pressure plant. The first step in this series of events was a heavy steam load with the water tube boiler carrying about 300% of rating. The load dropped suddenly and the fireman rushed to open the by-pass around the feedwater regulator as the water level in the boiler drum dropped suddenly. He then checked his fires to prevent popping of safety valves.

When he next thought of the by-pass valve the water level was above normal. He closed the by-pass and then there was a sudden surge of steam demand. Water entrained with the steam in a sudden gush found its way into the turbine and the broken blades and shroud bands were the result. As the blades and shrouding broke, severe vibration of the turbine resulted in ruptured oil lines and severe strains in the turbine.

Fortunately a wide-awake turbine operator tripped the circuit breaker and over speed trip before the machine wrecked itself.

By A. T. LOHKAMP, plant superintendent, Pasco Packing Company, Dade City, Florida.

Water damage to a 1500 kw turbine.



$$$ For Your Ideas

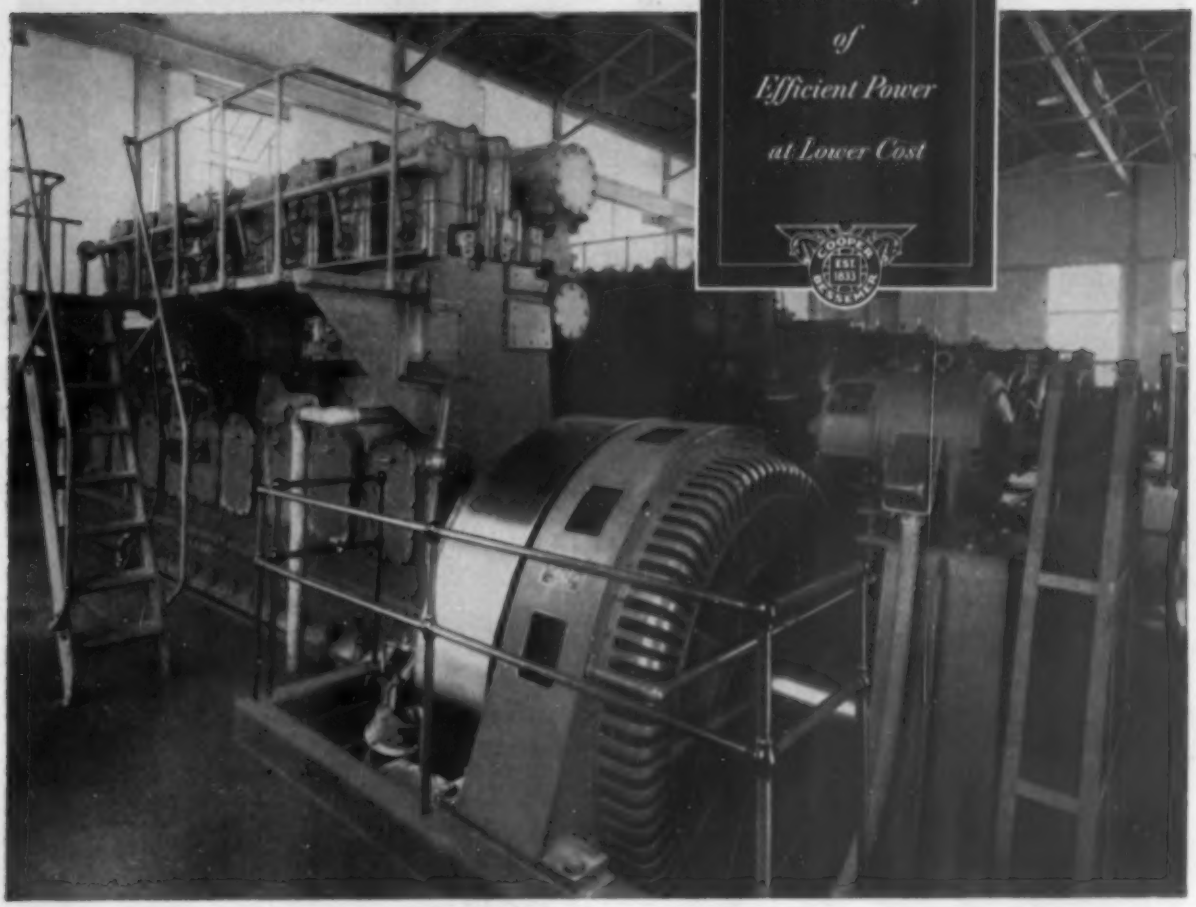
Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
806 Peachtree St., N.E.
Atlanta 5, Georgia

Interior of Hearne's municipal power plant with latest 1715 hp Cooper-Bessemer supercharged Gas-Diesel in foreground. City Manager N. L. McCarver reports that engine's fuel and lube cost averages .00252 mills per kwh.

Another Example of Efficient Power at Lower Cost



BIGGEST TAXPAYER IN THE CITY OF HEARNE

Cooper-Bessemer Gas-Diesel Power!

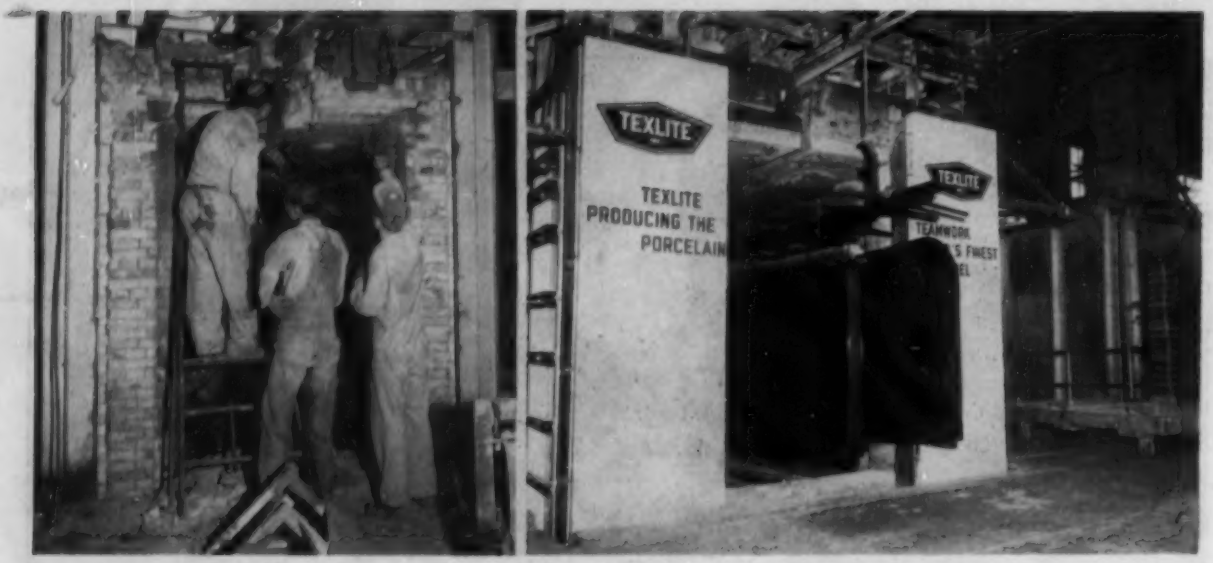
TO the 4,778 citizens of Hearne, Texas, modern Gas-Diesel power has been a real boon indeed. Not only does their municipal power plant produce 64% of the city's total revenue, but it is largely responsible for low property taxes, a 92-acre municipal park, a golf course, fully equipped club house and a big swimming pool with bath house, to say nothing of street lighting, free school service and other contributory services.

Hearne's base generating load is carried by two Cooper-Bessemer Gas-Diesels — 1000 hp and 1,715 hp units installed in 1947 and 1950 respectively. Fueled mostly by gas, these modern, exceptionally efficient engines last year operated at a fuel cost of only $0.002755 per kwh compared with $0.00465 for older type oil burning engines in 1946.

Says City Manager N. L. McCarver, "We made a good investment in our Cooper-Bessemers. They are not over-rated and will pull their load without the least bit of trouble. The new turbocharged engine is now down for annual check-up and is the cleanest engine we ever saw."

MOUNT VERNON, OHIO
COOPER-BESSEMER
GROVE CITY, PENNA.

New York Washington, D C Bradford, Pa San Francisco Houston, Dallas, Greggton, Pampa and Odessa, Texas Seattle Shreveport St Louis Los Angeles Chicago Cooper-Bessemer of Canada, Ltd., Halifax, Nova Scotia Tulsa Gloucester, Mass. New Orleans, La.



LEFT: Burners and tubes being installed; RIGHT: Improvements completed

Furnaces Modernized—Production Increased

A MODERNIZATION program on one of its high temperature furnaces by Texlite Inc. of Dallas, manufacturers of porcelain enamel products for the sign and building industries, has just been completed. This modernization was done to increase temperature uniformity inside the furnace, to speed the recovery rate, to increase productivity, and to increase the fuel efficiency.

In order to accomplish these objectives, the following improvements were made:

1. All thirteen radiant tubes were supplied with new type gas burners to improve burning efficiency.
2. Two additional tubes were added at the top of the furnace to help in overcoming heat losses due to the conveyor slot in the roof of the furnace.
3. An additional exhaust blower was hooked up to the radiant tube exhaust manifold to assist in maintaining more uniform temperatures for the whole length of the tube.
4. Air actuated side operating doors were installed replacing an electrically actuated vertically operating door to reduce door opening and closing time.

The whole rework program had to be carefully planned to reduce the furnace down time to a minimum. The program was completed with a shut down of only eight working days.

The results of this modernization have been very satisfactory. Temperature uniformity was greatly improved, the recovery rate has been speeded up, and the burning cycle has been reduced by approximately 25%. An additional improvement in the burning cycle was realized by reducing the door operating time by approximately 50%.

By FRED C. CRANE, Chief Industrial Engineer, Texlite Inc., Dallas, Texas.

Cleaning Capacity Doubled in Oklahoma Plant

DOUBLE the cleaning capacity, better surface quality, and a lower cleaning cost were realized by Halliburton Oil Well Cementing Co., Duncan, Oklahoma, as a result of adopting airless abrasive blasting as a means of cleaning the wide range of steel castings used in their oil well servicing equipment.

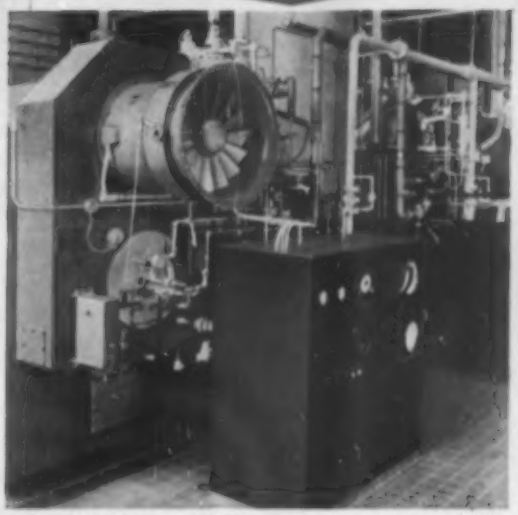
The items cleaned at this plant include: rough castings, partially machined parts, mill steels before machining, and used parts to be repaired. These parts range from a fraction of a pound up to hundreds of pounds each.

In view of the wide variety of parts to be handled, and the variety of sizes to be handled, engineers of American Wheelabrator & Equipment Corp. recommended a Swing-Table-type airless blasting machine. It provides maximum versatility because of the 86" diameter work table which is mounted on the door of the machine. A few large pieces or hundreds of small ones can be laid on it.

The total time for loading, clean-

keeping steam cheap . . .

Low Cost Steam
produced here



Dual-unit installation of B&W Type FM Boilers at American Hoist and Derrick Company plant, supplying steam for processing and heating.

Helps American Hoist
cut costs here

Aerial view of large plant and facilities of American Hoist at St. Paul, Minnesota.

To reduce substantially its overall steam generation costs and overcome the problem of meeting wide and erratic load swings due to the use of steam hammers in the forge shop, American Hoist and Derrick Company of St. Paul, Minnesota replaced two old boilers with two B&W Type FM Boilers.

Now in service for over a year, the compact FM Boilers are providing steam for both processing and heating . . . are readily meeting all the service conditions under the direction of their automatic controls. Each unit has a steam capacity of 25,000 lb per hr at 200 psi, is equipped with a superheater to provide steam at proper temperature for various plant operations, and is designed to burn either gas or oil.

The FM Boiler is ideal for small to medium-sized operations, and has been widely applied to many larger installations as well, where multiple FM units have been found to be practical and more economical than one or more larger boilers requiring complete field erection and close operating supervision. The FM is self-contained and easy to install. For example, many have been set in place with equipment similar to that made by American Hoist. It is delivered complete with firing equipment and controls. This versatile steam generator is enjoying wide popularity with users in a large variety of industrial, commercial, institutional, and other classifications. The number of units now in service or on order have a total steam capacity of more than 9,000,000 lb per hr. It is available in standard sizes for loads ranging between 2900 and 36,000 lb of steam per hr at pressures to 235 psi. Special units for higher pressures are also obtainable.

The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

CONSIDER THESE COST-SAVING FEATURES

- Saves Erection Time and Cost
- Meets Wide Range of Service
- Handles Quick Load Changes
- Fast Steaming
- Low Maintenance
- Easy Accessibility
- Suitable for Outdoor Service
- Burns Oil and/or Gas
- Saves Fuel
- Saves Space
- Safe, Automatic Operation

BABCOCK & WILCOX

BOILER DIVISION

G-686

ing, and unloading a typical batch of parts is 30 minutes, with the time the parts are actually in the blast cleaning zone being around 10 to 12 minutes. In an average work day of 8 hours, approximately 14,000 lb of work pass through the machine. This makes the cost of cleaning amount to ½¢ per lb on work ranging from zero to 50 lb in weight, and ¼¢ per lb on parts weighing 51 lb and higher.

Kentucky Plant Saves 50% by Using Plastic Pipe & Fittings in Deionized Water System

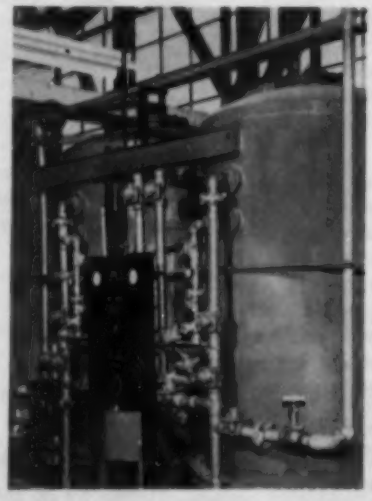
AT General Electric Company's Appliance Park, Louisville, Ky., the cost of material for a major piping installation has been cut an estimated 50% by using unplasticized polyvinyl chloride rather than the Type 304 stainless steel originally considered for the job.

The corrosion resistant PVC piping carries room temperature deionized water with a 300 psi total head. Main lines are 2 in. and laterals are ¾ in. and 1½ in. Injection molded fittings are employed in making changes in direction. They are manufactured exclusively by Tube Turns Plastics, Inc., Louisville, Ky.

Deionized Water Used

High purity water is required in substantial quantities at Appliance Park. It is used in washing GE refrigerators with an alkali-water solution, and in final rinsing operations, prior to the application of porcelain enamel. It is also employed in milling frit.

Deionized water, instead of distilled water, is used since it most economically meets GE's needs in this instance. The elimination of ions (electrified particles of matter of subatomic dimensions) from GE's process water prevents discoloration of the enamel.



Portion of the polyvinyl chloride piping that serves Penfield deionizers at General Electric's Appliance Park in Louisville. It was fabricated with injection molded fittings and flanges made by Tube Turns Plastics, Inc.

GE employs two deionizer units, built by the Penfield Manufacturing Company, Meriden, Conn. Each unit has two absorption towers and a capacity of 60 gpm. They form a central system that serves both the refrigerator unit and cabinet buildings.

PVC piping, such as installed by GE, is coming into wide use where corrosion conditions are present. It is relatively low in cost, inert, light in weight, and possesses non-aging characteristics. It has excellent electrical and insulating properties, and is easy to install and disassemble.

GE's piping for deionized water distribution was installed by Kerby-Saunders, Inc., a subcontractor for the Turner-Struck Construction Company.

Telemetering System

THE Tennessee Gas Transmission Company is using Metameter Telemeters combined with an AT&T Sotus Unit and Dialing Selector to control pressure, flow, and metering at delivery points spread over a 150 mile distance in the mountains of West Virginia. There are six delivery points which include both two-meter and three-meter tube meter and regulating stations.

Wide demand variations sometimes make it necessary for the company to transfer as much as 3500 mcf of gas per hour from one point to another on the request of the customer's dispatcher at any hour of the day or night.

The entire system is controlled by the field dispatcher from a central station at Broad Run, W. Va. Control of 51 functions is maintained through a Metameter Telemetering system operating over a single circuit.

The field dispatcher can dial in readings of static pressure, cus-

New Prudential Building to burn coal the modern way

Ultra-modern in all respects, the new 41-story building of the Prudential Insurance Company of America in Chicago incorporates the latest developments in design, fixtures and construction. This beautiful structure will be completely air-conditioned and will offer its occupants all possible conveniences.

Among those conveniences will be Prudential's heating system, as up-to-date as the building itself. This most modern building in the country will burn *coal*. Cleanly. Efficiently. And its completely automatic coal handling and burning installation will provide sure, even heat *economically* under all conditions.

Investigate Your Fuel Costs

If you're planning to modernize your plant or build a new one—or if you are just interested in cutting fuel costs—find out how coal, burned the modern way, compares to other fuels. Why not talk to a consulting engineer or your nearest coal distributor. Their advice may save you thousands of dollars each year.

facts you should know about coal

Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar.

Automatic coal and ash handling systems result in a virtually labor-free plant.

Coal is the safest fuel to store and use. No dust or smoke problems when coal is burned with modern equipment.

In most industrial areas, bituminous coal is the lowest-cost fuel available.

Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

NATIONAL COAL ASSOCIATION
Southern Building, Washington 5, D.C.

Naess & Murphy—Architects and Engineers
George A. Fuller Co.—General Contractor
H. P. Reger & Co.—Heating Contractor

tomer's line pressure, and differential pressure on each meter tube at all of the six delivery points. He can also remotely vary the flow controller on each meter tube from no-flow to maximum flow by dialing the proper functions. The telemeter receiver continues to indicate the measured value of pressure or flow, while a corresponding indicating light burns on a flow diagram instrument panel, until the dispatcher clears the circuit for another reading or operation.

Data courtesy The Bristol Company

More Storage Space; Faster Material Flow

MECHANIZED materials handling cut operating time 75% and quadrupled storage area for the General Metal Products' St. Louis, Missouri, plant.

The firm has a three-phase materials handling system in its production of stampings, fabrications, and dies. Each phase of the system is based on the operation of three different types of electric trucks (Automatic Transportation Company) which carry materials to a variety of processing machines used in the plant which covers a six-acre area.

The three phases include the moving and stacking of shop boxes; inserting and removing dies from presses; and feeding small parts to punch presses.

FOUR-HIGH tiering expands storage space four times in this St. Louis metalworking plant. The Automatic electric fork truck tiers in excess of 11 ft, handling loads up to 4,000 lb.

Shop Box Handling

GMP uses an Automatic Skylift fork truck to transport steel shop boxes containing metal parts in various stages of fabrication. The truck handles these loads, weighing from 3,000 to 4,000 lb, in two operations: to transfer parts from department to department; or for stacking in a storage area at one corner of the plant.

Under the old hand-truck system, the shop boxes could only be stored at floor level. Since the Skylift tiers in excess of 11 ft, the boxes can be stacked four high—quadrupling the capacity of the former storage area.

Time involved in transporting and stacking the boxes with the Skylift fork truck was also cut drastically—completing in 15 minutes the work which required a full hour under the hand-truck method.

Die Handling

This same time study revealed that by substituting an electric-powered Automatic truck for a two-wheel hand truck, GMP had realized similar time savings in servicing dies to presses.

Forming dies are carried on the truck's forks from die storage racks to presses, as the die setters call for them. Weight of the dies range up to 6,000 lb, the rated capacity of the truck. Yet dies are swiftly and easily placed into the presses.

Small Parts Handling

Production of fabrications and assemblies constitutes a major portion of GMP's operation. With small parts in particular, volume processing requires top efficiency all along the line.

To speed production in this department, the firm employs a special Automatic fork lift truck, equipped with a "roll-over" or revolving clamp attachment. Barrels of small parts are transferred to a parts feeding hopper in position for the next manufacturing operation, raised and dumped by the truck. "Up to 20 such transfers can be accomplished per hour by one truck operator," the company states.

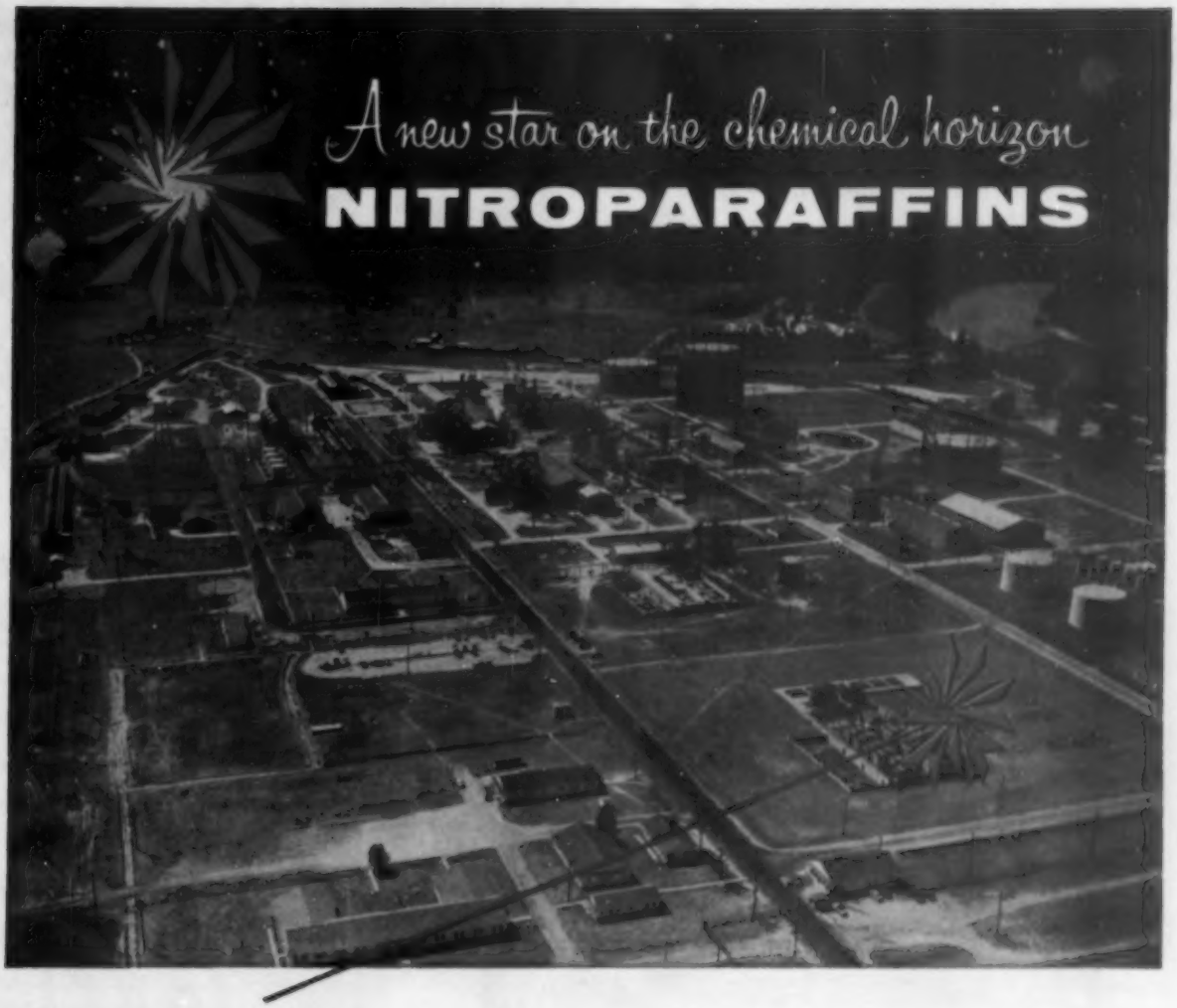
Before acquiring this versatile fork lift unit with a revolving clamp, press operators fed their own hoppers by stooping to pick up parts from a small container at their feet, an obviously tedious and time-consuming procedure.

Welding Stand

THE illustrated stand was constructed to assist in welding flanges. Any size flange can be welded to the nipple by bolting the flange to the wheel and slipping the wheel into one of the 2" sleeves so that it can be easily rotated.

Stand not only saves welder's time by holding the flange in a convenient position but also improves weld quality.

By CHARLES W. DEERE, Welder, Machine Shop, Katy Gas Cycling Plant, Humble Oil & Refining Company, Katy, Texas.



In the starred area above, construction has started on the new five million dollar plant for the commercial production of the Nitroparaffins and their remarkable family of derivatives. The new plant, the first major step in the company's Nitroparaffin expansion program, is expected to go on stream August 1955.

Located at Sterlington, Louisiana, the new plant is surrounded by CSC's great petrochemical facilities, from which such useful and basic products as methanol, ammonia, and nitric acid flow to all industry. In addition to the new NP plant, existing facilities at Peoria, Illinois, are being expanded.

Virtually laboratory curiosities a few years ago, the Nitroparaffins have been under study since 1935 in a continuing program of experimental production and evaluation. The four Nitroparaffins and six derivatives, which have already been produced and been proven useful in a wide range of applications, represent only a small fraction of the total number of derivatives under current investigation. The new chemicals represent a unique field of organic chemistry and hold unusual promise for virtually every industry.

The experience of Commercial Solvents Corporation in evaluating these versatile chemicals is available on request to every manufacturer.

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A-366

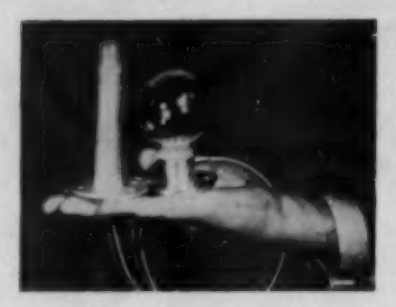
Equipment . . Supplies . . Methods

FOR FREE INFORMATION—Circle code number on pages 16 & 17

Explosion Extinguisher

D-1 FIREYE DIVISION, Electronics Corporation of America, 77 Broadway, Cambridge 42, Mass., has developed a tiny new electronically controlled device designed specifically to prevent fuel tank explosions on planes after direct hits in combat, and which also has wide application in industries dealing with highly combustible materials.

The heart of the new device is a miniature, rugged, lightweight photoconductive cell developed after years of research exclusively for detection of combustion. Mounted inside the

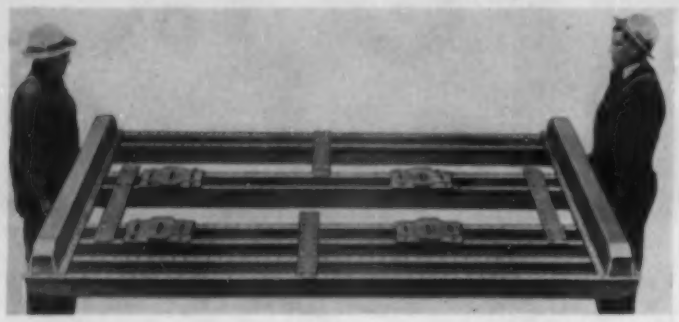


fuel tank of a plane, the cell detects an explosion by responding to its infrared output the instant it "sees" it. This response requires no flame contact, pressure rise, or temperature rise, but is instantaneous. The speed of detection of the explosion can be within one-millionth of a second of ignition.

Coupled with the cell inside the fuel tank of the plane is an explosive capsule containing a liquid extinguishing agent similar to carbon tetrachloride. When a bullet makes a direct hit on a fuel tank, resulting in an explosion, the cell responds to the infrared radiation of the incipient explosion by counter-exploding the frangible capsule to flood the fuel tank vapor space with extinguishing liquid.

This sequence of events successfully extinguishes explosions with little or no pressure rise instead of the several hundred pounds of pressure normally resulting from an unsuppressed explosion. Thus, in a few millionths of a second after the direct hit the explosion is extinguished before it ever really starts.

The new explosion extinguisher is now ready for marketing on a broad scale. Adaptations of the new device are being made by ECA engineers for use in ground fuel storage tanks, pumping stations, and similar areas, where explosions are an ever present hazard.



Universal Safety Skid

D-2 TUMPANE COMPANY OF GEORGIA, INC., Macon, Ga., is marketing the new Tumco Universal Safety Skid for moving heavy equipment and machinery.

Made of heavy aluminum extruded members, the skid is designed to save time and money in the moving, shipping and storing of machine tools and industrial equipment. Based on the simple assembly and versatility of a boy's erector set, the Tumco skid is available in 25 standard lengths which can be used as either headers or runners to assemble approximately 325 different skid sizes.

Using only a wrench, the skid can be assembled and loaded in approximately one man-hour. A completed 5′ x 10′ skid can be easily lifted by two men and yet has a load bearing capacity of up to 80,000 lb.

A unique engineering detail of the Tumco skid is the tapered wing channel shape of the members. These wing channel members absorb and distribute impact loads throughout the skid and lessen the shock absorbed by machine or equipment.

Bottom faces of skid members have been made thicker than sides, to compensate for wear over long periods of use. These bottom flanges also have sufficient area to support heavy machines or equipment on earth, or other comparatively soft surfaces, such as asphalt or wood block. Rounded sides permit easy insertion of forks of a lift-truck for easy side lifting. Rounded contour of the ends makes it possible to push the skid easily along the floor, without interference from small, low projections, particularly convenient in loading onto boxcars.

Aluminized Buildings

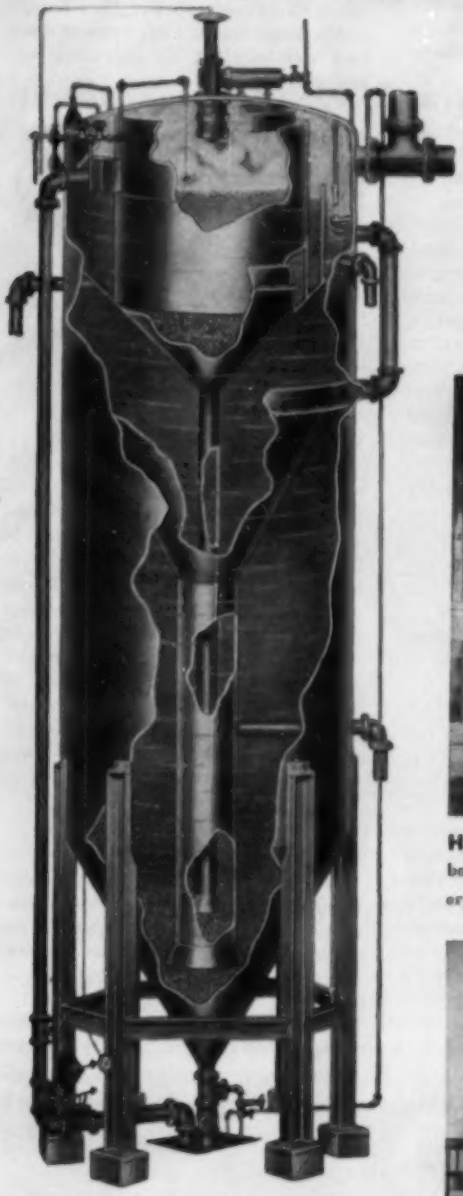
D-3 ARMCO DRAINAGE & METAL PRODUCTS, INC., Middletown, Ohio, announces that its complete line of Truss-Type (Series P) buildings are now available with Aluminized (Type 2) Steel covering as well as the corrugated Zincgrip steel previously supplied. These buildings are sold exclusively in the South and Southwest.

The new aluminized steel is reported to combine the corrosion-resisting and heat-reflecting qualities of aluminum with the strength of steel. This combination gives users better buildings with lower maintenance costs.

The company says that while zinc coatings are doing an excellent job of protecting steel against rusting,

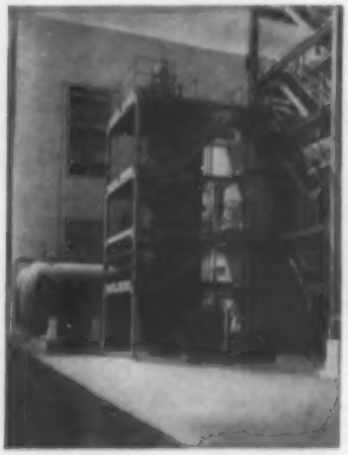
In Hot Process Softening, too

BELCO Builds a Complete Line-

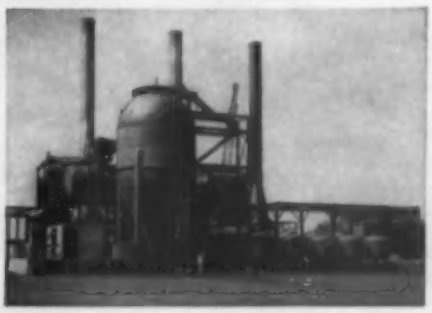


Belco-designed equipment provides high operating efficiency at low operating costs. Many of the country's largest industries rely on Belco for their water conditioning equipment. For example, Belco has built the largest fully automatic demineralization plant in the world and is currently furnishing one of the largest hot lime zeolite installations. A consultation with Belco could lead to lower operating costs for you, too. Write or call for technical assistance at any time.

HOT LIME SODA — Installation in boiler house at large eastern oil refinery. Has capacity of 200,000 lbs/hr.



HOT LIME SODA — Installation in large southwestern utility. One of three units with 90,000 lbs/hr total capacity.



HOT LIME BELCOLITE — Installation at large southern chemical company. Capacity 600,000 lbs/hr. This plant embodies "thoroughfare" operation of separate deaerator and hot process tank. The large hot process tank was designed, built and erected by Belco under its contract with customer.

Illustrated literature "Belco In Pictures" is available on request. Write for copy, today.

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BELCO DESIGNS ENGINEERS & FABRICATES WATER PROCESSING EQUIPMENT

the new aluminum-coated sheet is greatly superior. Field tests covering a 15-year period indicate that this new metal, without painting, should outlast common unpainted hot-dipped galvanized coatings by at least three to one in atmospheric service.

Type 2 Aluminized is said to have the same high reflectivity of radiant heat as aluminum, whether from the sun or from low temperature heat sources such as are used to heat buildings in winter. Also, it has the same high strength of zinc-coated steel because of the steel base under the aluminum coating.

Resistance to fire damage is asserted to be much better than that of aluminum or galvanized steel. The coating on Aluminized Steel withstands temperatures up to 900 F with no change whatever, and temperatures up to 1250 F without destructive heat scaling.

New All-Purpose Welder

D-4 THE LINCOLN ELECTRIC COMPANY, Box 3115, Cleveland 17, Ohio, is marketing the "Idealarc"—an all-purpose welding machine which permits selection of either a-c or d-c and either a soft or forceful arc.

The Lincoln Electric Company's Idealarc All Purpose Welders are available in 300, 400 and 500 amp a-c combined with d-c capacities in 200, 300, 375, and 450 amp.

For a-c welding jobs the machine provides a single phase transformer type welder; for d-c welding machine provides d-c current through heavy duty rectifiers.

The Idealarc is said to present an unusual opportunity for welders to select the proper welding arc for their application. The machine is available in several combinations. It can be obtained as an a-c welder without the d-c current. To this unit a d-c package can be easily attached in about one hour whenever desired. It is also available as a combination a-c and d-c machine with selection of either current made through a simple twist of a switch handle. Different output capacities of d-c and a-c can be combined to fit the machine to the job requirements.

The machine thus can be quickly set for maximum efficiency on every type of welding; ferrous or non-ferrous materials, sheet metal or heavy plate, all positions, and under arc blow conditions or poor fit up.

Both voltage and amperage are controlled to give the desired control of arc characteristics. Dual-control has long been a feature of Lincoln's SAE type d-c welders but never before has been available on any a-c transformers.

In addition to dual-control of the arc, the machine also has an arc booster switch for selecting normal or "hot" starting. The machine's inherent stability provides unusually good a-c current starting characteristics, but the switch permits controlling this to give efficient performance on different types of materials, in varying thicknesses and under different joint conditions.

Plastic Pipe & Fittings

D-5 CRANE Co., 836 S. Michigan Ave., Chicago 5, Ill., has introduced polyethylene plastic pipe and modified polystyrene insert fittings for industrial use.

Initial production of plastic pipe is limited in size from ⅛-inch to 2-inch. It is immediately available in the following standard coil lengths: ⅛" and ¾" in 400 foot coils; 1" and 1¼" in 300 foot coils; 1½" in 250 foot coils; 2" in 200 foot coils. It is also available in 100 foot coils in sizes up to 2". Crane's modified polystyrene fittings are insert ells, tees, couplings and adapters.

Mechanical Seals

D-6 BYRON JACKSON Co., P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif., announces a new type mechanical seal for high pressure boiler feed pumps which stops liquid loss, reduces heat loss and requires no operating adjustment.

These new mechanical seals are in operation in a number of high pressure, hot water pumping operations including temperatures up to 430 F. Reports show that heat and liquid loss is minimized and frequent repacking problems are eliminated. Also, maintenance is simplified since no operating adjustment is required.

Byron Jackson Co. makes a full line of mechanical seals for centrifugal pumps including special seals for chemical, volatile liquid, abrasive and high temperature problems.

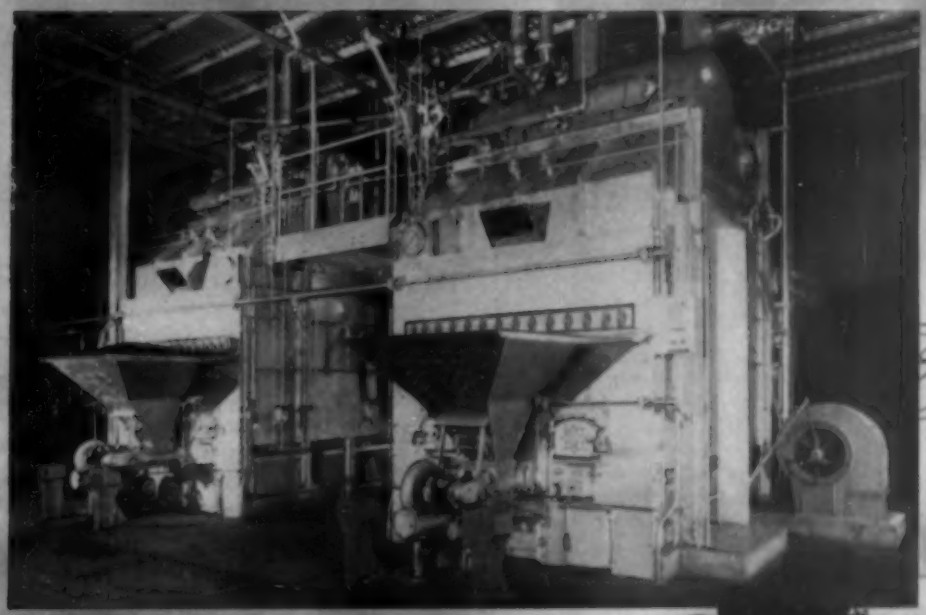
Portable Vise Stand

D-7 TOLEDO PIPE THREADING MACHINE Co., Toledo, Ohio, is offering a handy new portable vise stand with features that make it an efficient on-the-job work bench for the pipe fitter.

The new stand sets up or takes down quickly, as it is all one unit

DETROIT STOKERS HELP REDUCE COST OF STEAM AT PINEHURST

The Detroit Stoker Equipped Steam Plant at this Famous North Carolina Resort Serves three Hotels, seven other buildings



Steam Plant, Pinehurst, Incorporated, showing Detroit Single Retort Stokers. Boilers are Babcock & Wilcox Integral Furnace Type FF.

John F. Taylor, *Manager Utilities . . .*
Wiley & Wilson, *Consulting Engineers,* Richmond, Va.

The Carolina Hotel, Pinehurst, N. C.—the largest of the three hotels served by this modern plant.

Cost of steam per thousand pounds has been reduced 28½% by the new stoker—boiler installation, according to Mr. John F. Taylor, Utilities Manager, Pinehurst, Incorporated, Pinehurst, N. C. Amount of steam generated per pound of coal has been increased 22%.

The stokers are Detroit Single Retort Underfeed motor driven . . . the boilers are B&W Integral Furnace Type FF. A master regulator is connected to the Detroit Adjustable Feed Control on each stoker and to the adjustable damper of each motor-driven fan to regulate fuel and air in proportion to the load.

Detroit Underfeed Stokers provide high efficiency at low operating cost with small and medium size boilers.

Write for Bulletins

DETROIT STOKER COMPANY

GENERAL MOTORS BLDG.—DETROIT 2, MICH.
DISTRICT OFFICES IN PRINCIPAL CITIES • WORKS AT MONROE, MICH.

DETROIT SINCE 1898 STOKERS

with no loose parts. The built-in tray pushes up and folds for easy carrying and compactness. Though extra light in weight for portability, this new vise stand is extra sturdy and won't fold up in use.

Features include: large size vise base for easy mounting of Toledo or other vises, 3 pipe benders, tool slots, pipe rest, and ceiling brace.

Sprayed Foam Insulation

D-8 INSUL-MASTIC CORPORATION OF AMERICA, 1141 Oliver Bldg., Pittsburgh 22, Pa., announces that an entirely new idea in industrial insulation is being introduced in the form of a resinous liquid that is sprayed like paint, but immediately foams to twenty times its original thickness. The material is known as Poly-Cell.

The outstanding advantage of this new insulation is the speed at which irregular surfaces can now be insulated. Normally, it requires considerable cutting and fitting to properly place insulation around valves, fittings, flanges and other such projections. The problem of fastening the insulation in place is also troublesome. Bands, welded studs, wires, and other devices are used to hold the insulating material, and the more irregular the surface the more complex this binding problem becomes.

Poly-Cell is said to neatly eliminate both the fitting and the fastening tasks. Being sprayable, it can be installed wherever a spray gun can be pointed. It also will adhere of its own nature to practically any type of clean, dry surface. It will adhere equally well to moist surfaces.

It is sprayed as a liquid and at first it resembles a heavy coat of varnish. After a few minutes, however, it has swollen to a thick, airy cushion. After fifteen minutes the foaming action has ceased, leaving a normal looking semi-rigid insulation.

Its most economical thickness is ½ to 1 inch. One gallon of the liquid, when sprayed over 100 sq ft, will foam to a thickness of ⅝ of an inch. Less surface coverage will give a heavier insulation, and spraying a greater area will result in a thinner insulation.

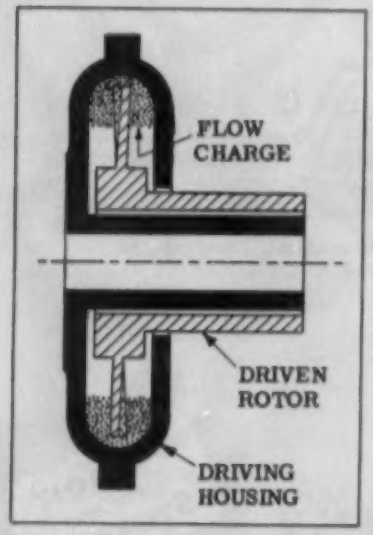
The K factor of Poly-Cell per inch of thickness has been given as 24 and weighs slightly more than 2 lb/cu ft. The high temperature limit is 225 F. The lowest temperature at which the new product has been tested so far is —40 F. It can be sprayed near flames with perfect safety as it contains no volatiles. It is non-combustible.

Dry Fluid Drive

D-9 DODGE MANUFACTURING CORPORATION, Mishawaka, Ind., announces a new development in industrial power transmission, called Flexidyne, and described as a dry fluid drive.

Based upon a completely new principle, Flexidyne easily handles difficult starting and reversing problems, and gives a new kind of protection against shock and overloads. Its major advantages over any other fluid type drive are based on the fact that at normal operating speeds it does not slip. At the same time, in the case of an overload, it is slippage which gives protection.

It is claimed to have wide application for industrial drives involving heavy inertia and shock loads on such equipment as compressors, centrifuges, conveyors, crushers, and machines used in metalworking plants, textile mills and the oil fields.



How Flexidyne Drive Works

1. The motor is connected to the housing, and starts it turning at no load.

2. The flow charge is thrown to the circumference of the housing, is compressed by centrifugal force, and revolves with the housing.

3. The rotor, connected to the load, is started and accelerated by the friction and wedging action of the revolving flow charge.

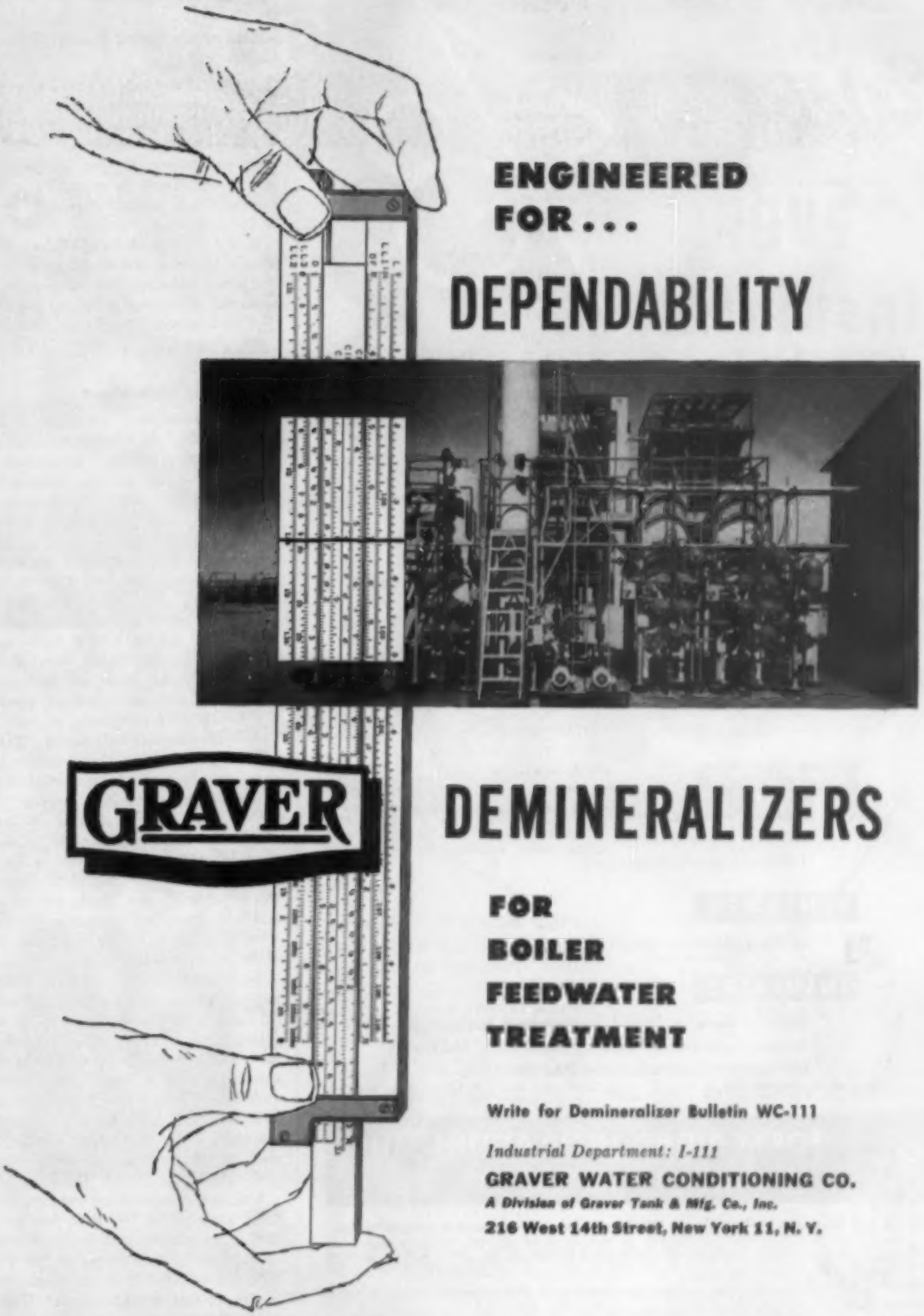
4. Rotor and housing reach identical speeds—the Flexidyne operates with zero slippage between motor and load at normal running speeds.

5. In case of an overload, before damage is caused, the Flexidyne rotor slips relative to the housing, overcoming the friction and wedging action of the flow charge. A thermal switch which automatically cuts the electrical circuit if an overload persists is available as optional equipment.

Spark-Proof Floor Grating

D-10 KERRIGAN IRON WORKS, INC., 1033 Herman St., Nashville, Tenn., is now making grating of aluminum. Its non-sparking quality makes it ideal for use in confined areas to reduce fire hazards. It is also light weight, non-magnetic, non-corrosive, has no maintenance costs and its high strength insures many years of service.

Kerrigan now manufactures types and sizes of grating for every need: steel, stainless, monel, aluminum riveted, steel riveted, extra close spaced, and serrated.



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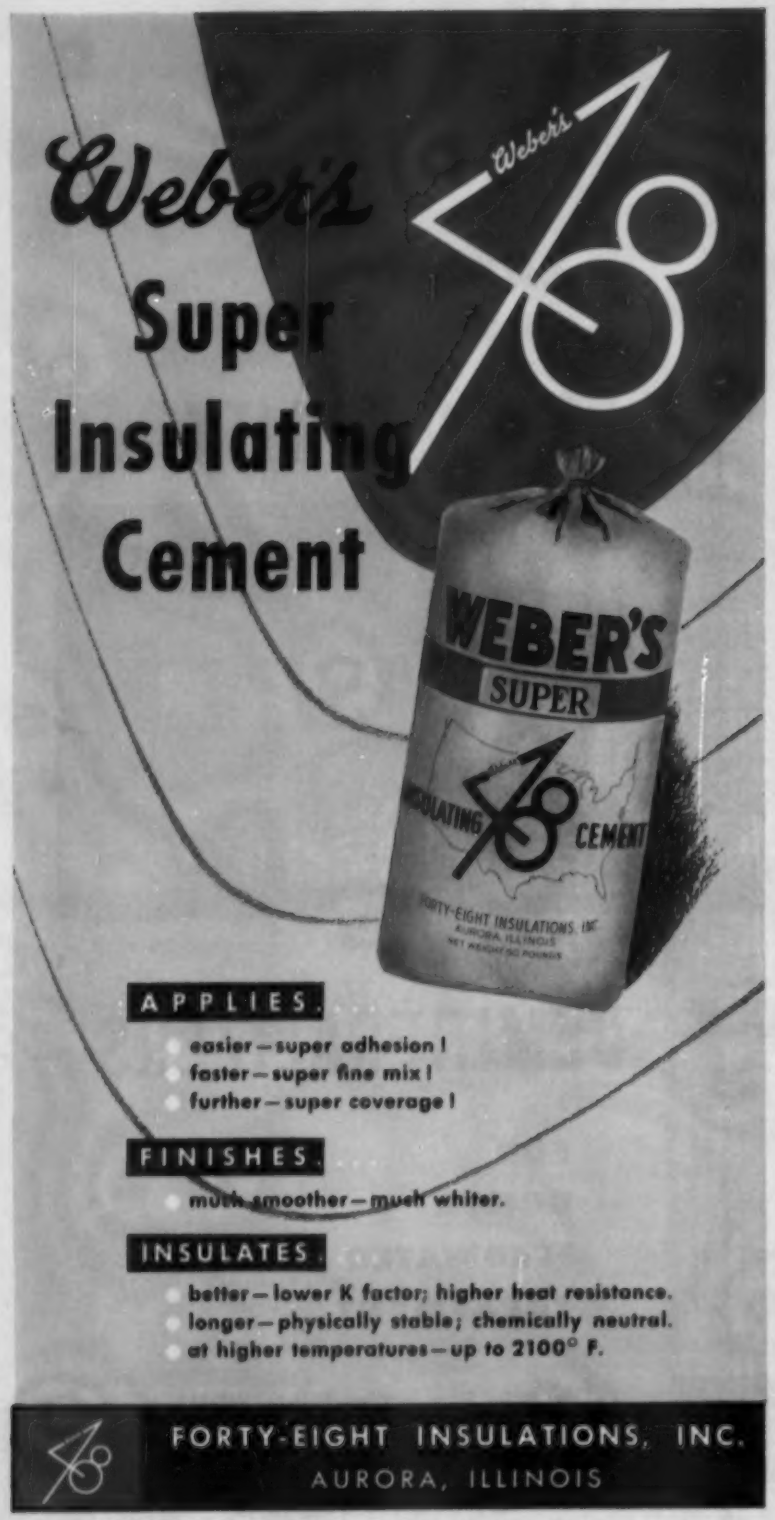

Send me full details on Weber's Super "48" Insulating Cement—and a sample to try.

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new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

Submersible Sump Pump

D-11 CARVER PUMP CO., Muscatine, Iowa, is offering a new submersible sump pump which will handle up to 3250 gpm.

The pump has no outside floats or rods, the motor housing is the float and is adjustable to operating range desired. Will operate in water up to 15 ft in depth.

Motor, ⅓ hp, and switch are completely enclosed and sealed in a stainless steel housing. No lubrication is required. Foolproof, automatic operation is assured. Discharge threaded for 1¼" pipe.

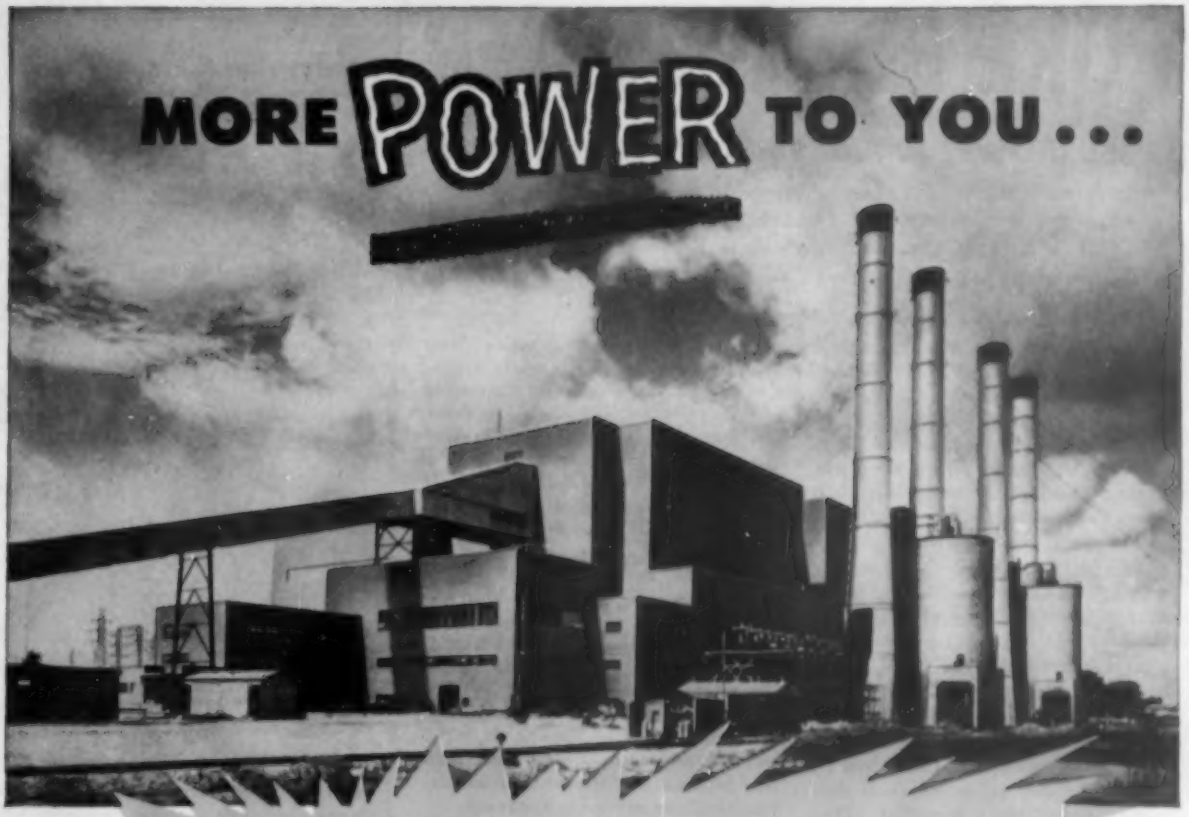
Sight Flow Indicators

D-12 JERGUSON GAGE & VALVE CO., 80 Fellsway, Somerville, Mass., announces a new line of top quality, dependable sight flow indicators which can be installed in any pipe line ½" to 2" N.P.T.

The sight flow indicators are available in transparent two-window and one-window, and reflex one-window types. Visibility of liquid flow is improved by obtaining turbulence through the interrupted bore of the fitting. Several types of indicating vanes may also be furnished, according to variable conditions of rate of flow and viscosity of liquid. These are installed within the chamber and show the flow or absence of flow by movement when liquid is flowing. The Reflex type flow indicator is used where the main objective is to show only whether or not there is liquid in the line. When liquid is flowing the glass will show black, due to the specially designed prismatic window; when the line is empty the glass will show a silver-white color.

Jerguson Solid Wedge Type Illuminators, which give an even diffusion of light over the entire area of the glass, are available for use with these flow indicators. In addition to the standard carbon steel construction, Jerguson Sight Flow Indicators are available in a wide variety of special stainless steels and other metals, as well as with linings of lead, phenol and rubber.

Pressure-temperature ratings vary from 2000 psi at 100 F to 600 psi at 1000 F in transparent double window types, and up to 3000 psi at 100 F or 1000 psi at 1000 F in the single window or reflex window types. Higher rated indicators are available on special order.



Detroit Edison Plant boosts U.S. Electrical Capacity to 100,000,000 KW.

Detroit Edison's St. Clair plant boosts U. S. generating capacity to a new high. The latest St. Clair unit, rated at 156,250 kw., to go on the line brought the total U. S. electrical capacity to over 100 million kw. Shell Turbo Oil 27 was purchased as the lubricant for this unit as well as for the other three turbine generators in this plant.

Shell Oil Company extends heartiest congratulations to Detroit Edison Company for their part in achieving this industry milestone in electrical power.

Shell is proud of its long association with the great electrical industry.

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

PURE PLANT WATER

is the answer to many production problems

Depleted water supplies and a consequent degenerating quality of water has caused much concern in industry. Even a small quantity of silica sand or organic impurities in water causes increased maintenance costs and reduces the quality of many products.

Some examples

One firm's problem was the breakage of their welding tips. The welding tips would become burned, turn brittle, and then break. Dirt in the cooling water was suspected, and Sparkler diatomite filters were put on the job. The life of the welding tips was extended eight to ten times by the use of filtered water.

Another firm has produced an off-white chemical for many years. Their source of water is a highly colored river which is heavily contaminated with industrial wastes. Sand filters had been used for many years but the product always carried a color trace from the raw water. When it was decided to improve the product's color, two 400 sq. ft. Sparkler diatomite filters were installed. This firm now produces a true-white chemical and have been rewarded by an increased demand for their product.

A third firm obtain their water from deep wells. The water, while fairly clear, contained a definite amount of very fine sand. This sand caused excessive wear in high head pumps and clogged fine fog nozzles interrupting production and increasing maintenance costs. Sparkler diatomite filters were installed on this four-million-gallon-a-day application and completely removed the above troubles.

The low initial cost of diatomite filters combined with their low floor space requirement and ease of operation have proved very attractive to industry. The diatomite filter will remove all silica sand, algae, organic matter and silt from water sources such as wells, rivers, or lakes. Bacteria is reduced 80% or even more in some cases. The quality of filtered water is always constant, no deterioration or variation is encountered. Add to the above that one filter can be cleaned with the output of a second filter, which eliminates the need for oversize pumps or large holding tanks for filtered water, and the reasons for the interest in diatomite filters are quite apparent.

The Sparkler Model SCJ diatomite filter is designed specifically for large volume water filtration. Available in sizes up to 2000 sq. ft. of filtering surface with capacities up to 5,000,000 gal. per day in a single unit. Multiple units engineered for larger requirements.

The original cost of a Sparkler diatomite filter is about 2/3 that of a sand filter and the floor space required less than 1/2.

Write Mr. Don Baldwin for engineering service on your plant water problem.

Crystal clear water is obtained from a pond for plant use at Trent Tube Co. with this Sparkler Model SCJ diatomite filter. Flow rate 1,152,000 gallons per 24 hr. day operation from this single filter unit.

SPARKLER MFG. COMPANY
Mundelein, Illinois

Sparkler International Ltd.
Plants at: Galt, Ontario, Canada
Amsterdam, Holland

Sparkler Manufacturing Co., Mundelein, Illinois

☐ Have engineering representative call for consultation on our water problem. ☐ Mail plant water filtering bulletin.

*Company*_____

*Address*_____

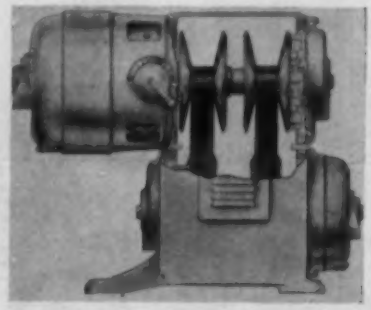
*Individual to contact*_____

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

Variable Drive Motor

D-15 U. S. ELECTRICAL MOTORS, INC., Box 2058, Los Angeles 58, Calif., has upped their Varidrive motor to 60 hp to provide for extra heavy-duty services where variable speeds are needed. Previous top power limit was 50 hp.



U. S. Electrical Motors' 60 hp Dual Belt Varidrive Motor.

The increase of power broadens the application of variable speed. These larger capacity motors may also be equipped with remote control, either mechanical or electrical. The 60 hp motors are equipped with dual varibelts of double-ribbed design which divide the transmission load so that excessive strains are avoided.

Semi-Portable Heater

D-16 VAPOR HEATING CORPORATION, 6420 W. Howard St., Chicago 31, Ill., announces a semi-portable Waikiki Space Heater No. 4820 which can be used to good advantage to heat buildings under construction, garages, loading docks, sheds or to cure concrete. It heats and circulates 2500 cfm of air, or this may be reduced to 900 cfpm.

The heater has an oil burner or may be equipped with a natural gas or bottled gas burner. The fuel nozzles can be changed to give 80,000 to 200,000 Btu input. A squirrel cage type

For liquid-handling economy

select the right pump for the job

Goulds pumps are designed for easy maintenance and built so they need a minimum of it.

These seven groups of pumps are only a few of the many models made by Goulds—yet in these groups are pumps for hundreds of industrial liquid-handling jobs—242 combinations of pump models, sizes and materials.

Standardization of parts for interchangeability among different groups of pumps helps keep your parts inventory low. And most models are available in a variety of materials to suit varying liquid-handling requirements.

Many other unique features mean fewer maintenance worries for you, longer service life. Support heads have a cooling chamber preventing transfer of heat to bearings. Shaft sleeves are shouldered on the shaft near the impeller. They expand and contract freely with temperature changes. Sealed housings keep dirt and moisture out of the ball bearings.

Specify Goulds pumps and take advantage of their cost-saving features. Your Goulds representative will help you select the pumps best suited to your needs. Consult him on your liquid-handling problems, or write direct to Goulds Pumps, Inc., Seneca Falls, N. Y.

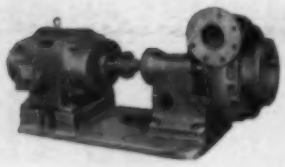


Fig. 3765 single-stage, enclosed impeller pump, available in 21 sizes providing capacities up to 3,800 GPM, heads to 400 ft. Extra-heavy construction throughout, for trouble-free service 24 hours a day, over long periods. Send for Bulletin 715.1 for specifications, performance curves.

Fig. 3718 single-stage, chemical pump for handling corrosive and abrasive liquids. 9 sizes provide capacities up to 730 GPM, heads to 200 ft. Available in Types 316 and Gould-A-Loy stainless steel, all-bronze, all-iron, bronze-fitted, or iron or bronze with stainless trim. Ask for Bulletin 725.4.

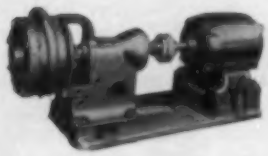


Fig. 3345 two-stage pumps in 5 sizes provide heads up to 500 ft., and capacities to 120 GPM. Impellers mounted back-to-back neutralize end thrust. Impeller clearance easily adjusted by external means. Write for Bulletin 718.2.

Fig. 3320 "close-coupled" two-stage pump, in 5 sizes, provides heads to 500 ft., capacities to 120 GPM. Impellers mounted back-to-back, directly on extended motor shaft. Permanent alignment assured by recessed lock fit on adapter. Ask for Bulletin 713.1.

Fig. 3770 single-stage, enclosed impeller pump, with belt or motor drive. 14 sizes with capacities ranging from 10 to 1,800 GPM, and heads to 120 ft. Ideal for clear liquid applications. Available in all-iron, all-bronze or bronze-fitted construction. Write for Bulletin 622-A2.

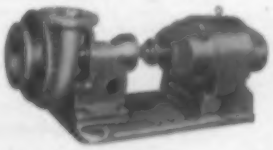


Fig. 3189 single-stage, open impeller pumps, with belt or motor drive. 10 sizes provide capacities up to 1,000 GPM, heads to 180 ft. Especially built for handling slurries, other solids—containing liquids. For specifications, performance curves, write for Bulletin 730.4.

Fig. 3660 single-stage "close-coupled" pump, for motor or turbine drive. 28 sizes offer capacities to 2,000 GPM, heads to 400 ft. All units are self-contained, need no special foundation. Open-top construction gives ready access to gland and stuffing box. Available in all-iron, all-bronze, or bronze-fitted construction. Send for Bulletin 710.1 to get specifications, performance curves, other details.

Goulds PUMPS INC.
Seneca Falls
New York

Atlanta • Boston • Chicago • Houston • New York • Philadelphia • Pittsburgh • Tulsa

COMPLETE METAL STAMPING FACILITIES for Southern Industry

Campco's plant with *complete* metal stamping facilities sits in the heart of the industrial South. The completeness of these facilities is measured by 67 major units of equipment, including a 300-ton hydraulic press.

From design through delivery, skilled native labor takes pride in converting your production ideas into finished metal products. Added to this production skill is *Economy*—stemming from the lessening of transportation costs. Campco's *Nearness* too becomes of vital concern when production schedules are tight.

If you use metal stampings, turn Southern progress to your advantage. Contact Campco's Design and Engineering Department for a quotation. No obligation, of course.

CAMPCO

Just off the press,—Brochure No. 100, "The *Complete* Metal Stamping Service". Order yours today.

CAROLINA METAL PRODUCTS, INC.

BOX 3636 **CHARLOTTE, NORTH CAROLINA**

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

blower circulates air around the three combustion chambers, which have ample heat transferring surface.

Once started, thermostats with variable settings take over, causing the heater and blower to automatically cycle on and off; an electric spark insures proper lighting. The heater is easily installed by making three service connections: one to a 110 volt outlet, fuel to the burner, and an exhaust outlet. The heater can be picked up and moved about, or it may be suspended from the ceiling.

Overall dimensions of the vapor Waikiki Space Heater No. 4820 is 48" long, 24" high, 36" wide, shipping weight 400 pounds. The present list price is $399.00 fob factory.

Plastic Electrical Tape

D-17 BEHR-MANNING CORPORATION, Troy, N. Y., has added to its line of quality paper-backed pressure-sensitive tapes for industry, new plastic electrical tapes, called Behr-cat 507, 510 and 520, which are 7, 10 and 20 mils thick, respectively.

The high dielectric strength of their vinyl plastic backings — over 1,000 volts per mil of thickness— helps account for their superiority over combinations of rubber and friction tapes for electrical applications. Fewer wraps of plastic tape are required for the same electrical resistance. With less tape required, it follows that there is less bulk with which to be concerned. Less time and labor is required for application.

The tape can stretch at least one and a half times its length without breaking, which makes for conforming ease. This, coupled with its thinness and lightness, permits much neater, more attractive splicing. Excellent results are promised in: junction boxes, electrical harnesses, straight splices, refrigerator wiring, wrapping battery cables, ignition harnesses, power cable splices.

The vinyl backing withstands acids, alkalies, water, salt water and oils so the tape is a natural for such uses as production electroplating and anodizing or wrapping subterranean pipe to protect it from corrosion by chemicals in the ground.

Which type of steam trap is best for your need?

1 Sarco Balanced Pressure Thermostatic

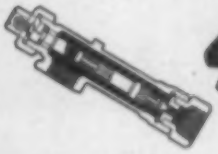
Greatest capacity per dollar cost. Large air venting capacity. Same head and seat, 0-300 psi. Freeze-proof. Cat. 250-A

2 Sarco Float-Thermostatic

Discharges condensate continuously at steam temperature and without shock. Responds immediately to varying loads and pressures. Cat. 450-A

3 Sarco Camlift Bucket

New, powerful Camlift valve mechanism permits greater discharge with no increase in size of trap body. Cat. 360-



4 Sarco Liquid Expansion

Adjustable to discharge condensate below 212°F. Freeze-proof. Not affected by water-hammer or pressure pulsations. Cat. 260-A

5 Sarco Thermodynamic

Valve head, a solid stn. st. disc, is only moving part. Same head and seat to 600 psi. Not affected by superheat, water-hammer, corrosive condensate. Cat. 255-A

With these 5 different types to offer, Sarco can give you impartial advice

Any type of steam trap will do "some kind" of a steam trapping job for you.

But there's a world of difference in trapping efficiency when exactly the *right* type of trap is used for a given application.

That's because both trapping conditions and the characteristics of different types of traps vary widely. There simply isn't any *one* type of trap that will do an efficient job under *all* circumstances. But there is always a particular type of trap best suited for each *specific* set of conditions.

That is why Sarco makes all 5 basically *different* types of traps. In a nutshell, it's to assure you of best trapping results at all times, regardless of requirements.

And don't overlook the very important fact that *only* Sarco makes all these 5 types — not merely variations of one type. Therefore, Sarco can give you absolutely impartial trapping recommendations, backed by 43 years of field experience. Call your local Sarco representative or write:

SARCO COMPANY, INC., Empire State Building, New York, N.Y. Represented in Principal Cities.

7083-B

ONLY SARCO makes all 5 types of traps

—not merely variations of one type!

SARCO SAVES STEAM

Thirty Million B.T.U. CAPACITY

with Precise Control of Temperature in Cooling

The NIAGARA Aero HEAT EXCHANGER cools liquids and gases by evaporative cooling with atmospheric air, removing the heat at the rate of input, controlling temperature precisely. You save 95% of cost of cooling water; you make great savings in pumping, piping, power; quickly recover your installation cost.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemical intermediates, coolants for mechanical, electrical and thermal processes. You obtain closed system cooling free from dirt. You solve all the problems of water availability, quality or temperature.

In CHEMICAL PROCESSES this is successfully used in cooling liquids and gases, chemical reactions, condensing distillations and reflux cooling.

Write for complete information; ask for Bulletins 120 and 124. Address Dept. SP.

NIAGARA BLOWER COMPANY

405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

News (continued)

(*Starts page* 10)

John Fisher Asst. P.A. for Chemstrand Corporation

JOHN C. FISHER has been promoted to the position of assistant purchasing agent for THE CHEMSTRAND CORPORATION, according to Norman C. Stiles, general purchasing agent.

Mr. Fisher, who joined Chemstrand on December 19, 1951, previously was associated with John W. Galbreath & Company at Fairfield, Alabama.

Ormston Named Chief Mech. Engr.—Florida Power Corp.

ALFRED J. ORMSTON has been promoted to chief mechanical engineer of the FLORIDA POWER CORPORATION to succeed PAUL L. BARTOW, who died on Jan. 14. Mr. Ormston served as chief assistant to Mr. Bartow for several years in the utility's expansion program.

Alfred J. Ormston

As chief mechanical engineer, Ormston will be in charge of all plant construction in the company's continuing building program, including the 70,000 kw addition under construction at Turner Plant, and the 75,000 kw addition to be built at the Suwanee River Plant at Ellaville.

A mechanical engineering graduate of the University of Florida, Ormston joined the company in 1939 as a cadet engineer. He served in various engineering capacities with the company since that time, with five years out for Navy service. He was promoted to assistant chief mechanical engineer in 1951, and prior to that served as assitant chief engineer of the Higgins Plant during its construction.

360° hoist hook service...

Here's the answer to economical local handling service to process machines, particularly beneath heavy mill type cranes... it's the American MonoRail Pedestal Jib. These jibs are recommended for capacities between 500 to 4,000 pounds, headroom 9 and 12 feet, and boom length 8 and 12 feet... a truly precision built, skillfully engineered job. Turn to American MonoRail for any overhead handling requirements. Your American MonoRail engineers will be glad to consult with you.

For any MonoRail application write for Bulletin C-1

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

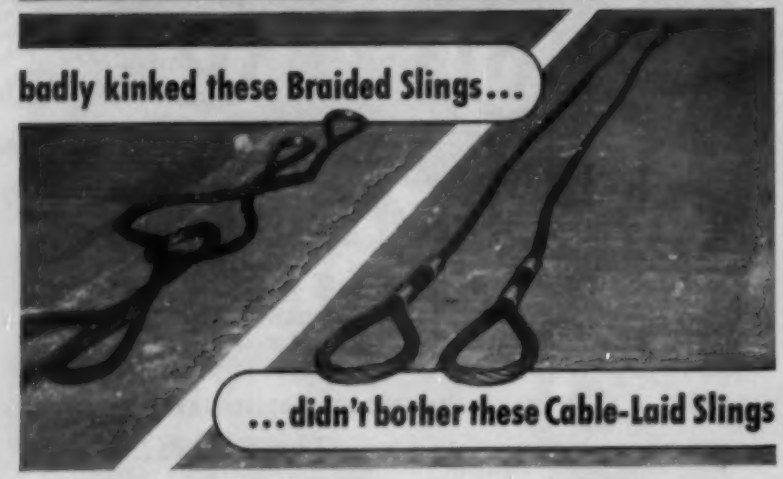
13105 ATHENS AVENUE • CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

ACCO products

This 34-Ton Load...

badly kinked these Braided Slings...



...didn't bother these Cable-Laid Slings

Here's Why:

Because these ACCO *Registered* CABLE-LAID slings combine the flexibility of manila rope with the strength of steel.

The secret of the CABLE-LAID sling is in the construction of the rope. It's a combination of six wire ropes laid around a special steel center to give you a rugged steel body which has:

- **Freedom from Crankiness**
- **Extreme Flexibility**
- **Resistance to Kinking**

With their patented DUALOC endings these CABLE-LAID slings are tops in ease of handling . . . resist abuse . . . and give you longer sling life which reduces lifting costs. And these slings are ACCO *Registered*—with all the advantages that make this specification the standard of efficiency and safety.

See your ACCO Registered distributor or write our Wilkes-Barre, Pa., office today

ACCO

Wire Rope Sling Department
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn. • In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

for Better Value

News (continued)

Western Engineering Opens Birmingham, Ala., Warehouse

THE WESTERN ENGINEERING & MANUFACTURING Co. of Venice, California, announces a special service to southern industry with the opening of its BIRMINGHAM, ALABAMA, warehouse. The new facility will stock Western's complete line of rotary roof ventilators.

Three of Western's representatives are especially well-located to render service from Birmingham: BROWN-LEE-MORROW, 745 N. 44th Street, BIRMINGHAM, BEN M. SPANN, 10 Oregon St., GREENVILLE, S. C., and TENNESSEE HEATING SALES, P. O. Box 391, KNOXVILLE, TENN.

Daniel Constr. Co. Opens Virginia & Florida Offices

THE DANIEL CONSTRUCTION COMPANY of Greenville, South Carolina, and Birmingham, Alabama, has recently set up two additional offices and made changes in its corporate officers.

CHARLES E. DANIEL of Greenville, president and founder, becomes chairman of the board, and is succeeded as president by his brother, R. HUGH DANIEL of Birmingham, who will now hold the offices of president and treasurer.

C. A. THRASHER will continue as vice president and chief engineer. H. M. DANIEL will remain in the position of executive secretary.

CARL G. ENGLUND has been appointed vice president and manager of the GREENVILLE office; J. A. DANTICI, vice president and manager of Daniel Construction Company of Alabama with offices in BIRMINGHAM while H. L. Longcrier will be vice president and manager of Daniel Construction Company of Virginia, a new Division, with offices in RICHMOND. HARRY J. STELLMANN will serve as manager of the other new branch—Daniel Construction Company of Florida with offices in JACKSONVILLE.

Founded just 20 years ago, the Daniel Construction Company has grown to be one of the largest general contractors in the South. Current projects include the following in SOUTH CAROLINA: Liberty Life Insurance Company home office, Greenville; the new Furman University, Green-

ville; C. F. Sauer Food Processing Plant, Mauldin; James Dunn Manufacturing Company, Walterboro; Westinghouse Office Building, Hampton; and the Santee River Wool Combing Plant at Jamestown.

In ALABAMA, they are building additions to the Coosa River Newsprint Plant, Coosa Pines; a new plant for P. R. Mallory, Huntsville; Howard College, Birmingham; American Brake Shoe Plant, Carera; office building for American Liberty Insurance Company, Birmingham; and new bank buildings for the First National Bank and the Birmingham Trust National Bank, both of Birmingham.

In VIRGINIA, they are constructing two plants for the National Aniline Division of Allied Chemical at Hopewell and additions and renovations to the American Safety Razor Plant in Staunton.

In other states, they are building the twenty-six story South Central Home Office Building for Prudential Life Insurance Company, Jacksonville, Florida; a new Hosiery Plant for Burlington Mills, Franklin, North Carolina; a new fancy cotton goods mill for Cherokee Textile Mills, Sevierville, Tennessee; and have just completed the Coats & Clarke Thread Plant, Toccoa, Georgia, as well as a new plant for General Time Corporation in Athens, Georgia.

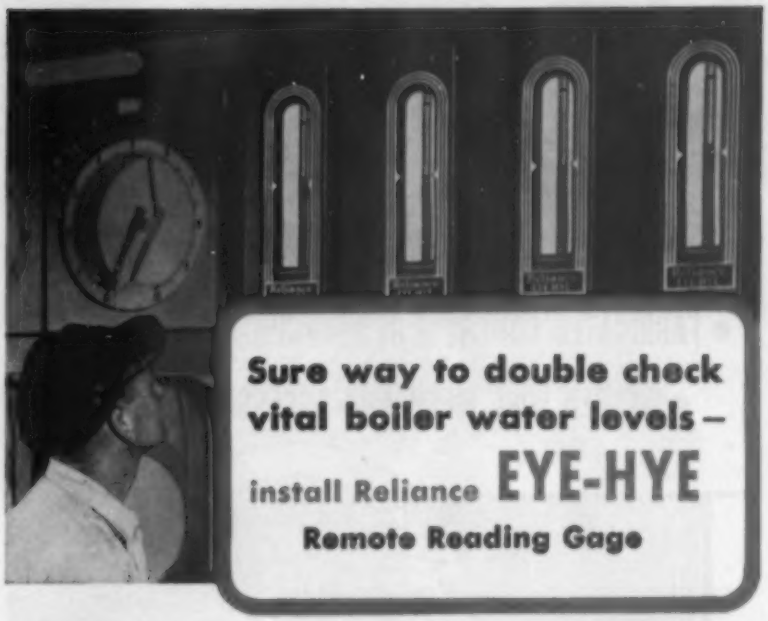
In addition to the above, they are also doing work for many leading manufacturers throughout the entire southeast.

Nashville Representative for Graton & Knight Co.

JAMES S. HAMER has been named sales representative of the GRATON & KNIGHT COMPANY for the territory covering west central Tennessee and Kentucky, northern Arkansas and Mississippi, and southern Indiana.

He will represent the company's industrial leathers and also the line of packings manufactured by the Graton & Knight subsidiary, International Packings Corporation. His office will be at 109 Allendale Drive, NASHVILLE, TENN.

Mr. Hamer was formerly industrial sales representative for Keith-Simmons Co. (Nashville, Tenn.). He was with this industrial distributor since 1948, interrupted by two years' service as Major and pilot in the U. S. Air Force.



Sure way to double check vital boiler water levels — install Reliance EYE-HYE Remote Reading Gage

It's fine to have automatic controls, but be sure you have the important safeguards against possible failure — adequate *maintenance* and *cross-checks.*

EYE-HYE is your reliable cross-check for *boiler water levels.* A manometric-type remote reading gage, it keeps operators informed on water level status. Easier to read than conventional gages, although it's the same familiar form — a vertical column of liquid. EYE-HYE's indicating fluid is a pleasing green that "pops out", brightly illuminated from the rear.

You can place EYE-HYE any reasonable distance from the drum — above or below it, on wall or instrument panel. Easy to install and maintain — no mechanical working parts — no adjustments on location. Write for Bulletin CO and learn how EYE-HYE can increase the efficiency of *all* your water levels.

How one user checks water levels in surge tank and feed water heater with long type EYE-HYEs. (Face plate can be calibrated at factory.)

The Reliance Gauge Column Company
5902 Carnegie Avenue • Cleveland 3, Ohio

Reliance EYE-HYE
Remote Reading Gage
All-hydrostatic • Reads like a tubular glass gage

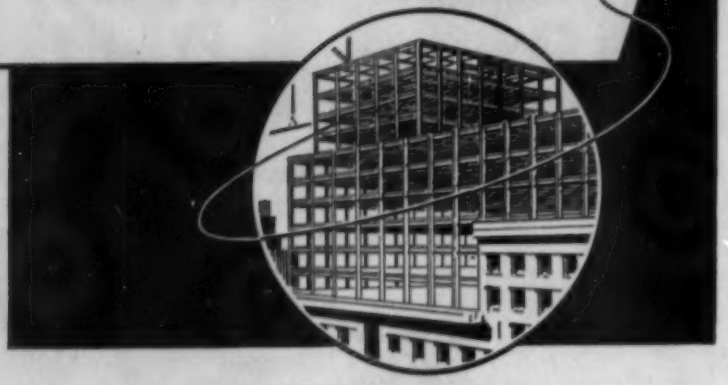
MORE AND MORE DIXIE CONTRACTORS AND BUILDERS USE

DIXISTEEL

TRADE MARK

• FABRICATED CONCRETE REINFORCING STEEL BARS

• WELDED WIRE MESH AND ACCESSORIES



• Quick, accurate estimates
• Competent engineering aid—detailing and bills of material
• Rapid, dependable service
• Adequate, complete stocks

Some say it's the top quality of our steel. Some say it's the accurate bending. Some say it's the service. Whatever the reason, more and more contractors and builders are turning to DIXISTEEL's Fabricating Division for mill-fabricated reinforcing bars, welded wire mesh and accessories. We believe you'll like to do business with us, too. So call us in on the next job—little as it might be, big as you hope it will be.

TYPICAL JOBS USING DIXISTEEL FABRICATED REINFORCING BARS, WELDED WIRE MESH AND ACCESSORIES

- Industrial buildings
- Commercial buildings
- Bridges—highway and railway
- Schools
- Airports
- Driveways
- Swimming pools
- Government buildings

FABRICATING DIVISION

Atlantic Steel Company

ATLANTA, GEORGIA • EMERSON 3441

News (continued)

Southeastern Sales Office for Schenectady Resins

Schenectady Resins, Division of SCHENECTADY VARNISH COMPANY, INC. has created a new sales region covering the Southeastern area of the United States. TOM KEE, with headquarters in ATLANTA, GEORGIA is now the Schenectady Technical Representative in this new territory. The complete Schenectady Resin Line will be offered this area, including phenolics, alkyds, terpenes, maleics and foundry shell mold and other specialty resins.

Mr. Kee, who joins the Schenectady sales organization after five years service with Reichold Chemicals, Inc. has had a wide background of experience in the chemical industry.

DeLuxe Saw & Tool Doubles Carolina Prod. Facilities

Alfred G. Feldman, general manager of DELUXE SAW & TOOL COMPANY, 415 E. Commerce Street, HIGH POINT, N. C., manufacturers of "Karbide King" saw blades and cutting tools, announces that the company will soon occupy newly constructed production space which will more than double present facilities and capacity. The firm's production is devoted exclusively to the manufacture of carbide-tipped saws and tools for the woodworking, composition and nonferrous material industries.

New, modern equipment of latest design is to be installed, and personnel will be increased proportionately. The expanded facilities will permit a wider range of manufacture, and will include various new saw and tool products. Plans also call for an enlarged reconditioning and sharpening department for faster service.

DeLuxe Saw & Tool Company, one of the pioneers in carbide-tipping saw and tools, was originally formed in 1945 in Chicago and still maintains a sales office in that city at 6459 N. Neva Avenue under the direction of Robert Ford, Sales Manager. The High Point plant and general office headquarters was established in 1947. Factory-authorized service centers have since been set up in principal industrial areas throughout the country.

Ryerson Steel Promotions

Announcement has been made by Thomas Z. Hayward, vice president in charge of sales for JOSEPH T. RYERSON & SON, INC., large steel service company, of the appointment of WEAVER E. FALBERG as general manager of sales, and JOHN A. HOUSTON as assistant general manager of sales, for the firm's nation-wide group of sixteen plants.

Southern industry is served from Ryerson plants at Charlotte, Philadelphia, and Cincinnati.

Orlando Armature Works Now A-C Service Shop

THE ORLANDO ARMATURE WORKS, INC., 600 West Central Avenue, Orlando, has been named a certified service shop for Allis-Chalmers motors, control and transformers in eight central Florida counties.

Area served by the firm, which was established in 1926, includes the counties of Orange, Seminole, Brevard, Osceola, Volusia, Lake, Marion, and Sumter.

Southeastern Manager for Cummins Engine Company

CUMMINS ENGINE COMPANY, INC., of Columbus, Indiana, has announced the appointment of J. P. JUNG, as regional manager Southeastern Region, with headquarters at 805 Peachtree Street, N. E., ATLANTA, GEORGIA.

Mr. Jung has been associated with the Company since February, 1947. He served 4½ years as assistant regional manager, Great Lakes Region at Cleveland, and for more than a year in the same capacity in the Southwest Regional Office at Los Angeles. Mr. Jung replaces R. P. PARSHALL who has moved to Milwaukee to take over the Cummins Distributorship as President of Cummins Diesel of Wisconsin, Inc.

Columbia-Southern—La.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION has announced that C. K. BALLARD, formerly works manager at Columbia-Southern's plant at LAKE CHARLES, LOUISIANA, has been appointed manager of production for the firm.

A. T. RAETZSCH, formerly superintendent of operations at the Lake Charles plant, succeeds Mr. Ballard there as works manager.

Costs Less Because
It Gives the Most in Service

When selecting unions it will pay you to remember 2 things: (1) Darts can be used over and over again — on location after location (2) On location after location, they give a drop-tight seal. How can you beat this combination for economy . . . at any price?

QUICK FACTS

- Extra wide bronze seats resist pitting and corrosion
- Nut and body of air-refined, high test malleable iron are practically unbreakable
- Heavy shoulders can withstand the toughest wrench abuse
- Each Dart is individually vacuum-tested

DART UNION COMPANY
Providence 5, Rhode Island
The Fairbanks Co., General Distributing Agents
Boston • New York • Pittsburgh • Rome, Ga.

DART
UNIONS

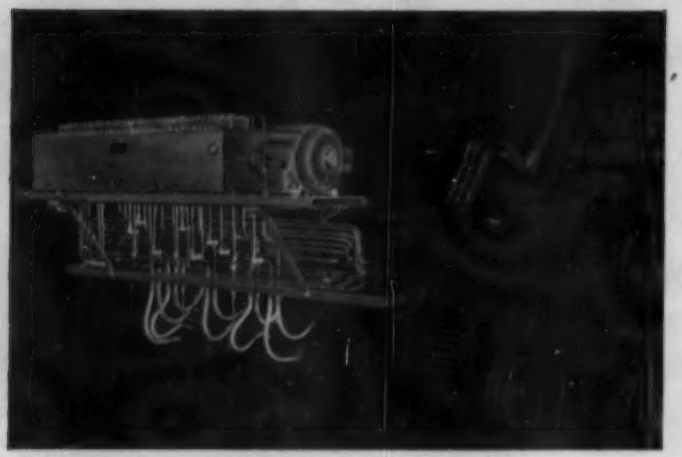
CALL YOUR LOCAL DISTRIBUTOR FOR PROMPT DELIVERY OF DART UNIONS

MANZEL

FORCE FEED LUBRICATORS

COST LESS...

than doing without them!



Pressure Application — Exact Amounts — Accurately Timed

* Manzel Force Feed Lubricators quickly save their cost by preventing breakdowns due to faulty or forgotten lubrication — by reducing the quantity of lubricants used — and by eliminating the labor of hand oiling. They keep vital parts properly lubricated for uninterrupted production efficiency round the clock.

You can have Manzel Force Feed Lubricators installed on present equipment or engineered into new machinery. Write for information.

Manzel

DIVISION OF FRONTIER INDUSTRIES, Inc.

318 BABCOCK STREET, BUFFALO 10, NEW YORK

News (continued)

CTI Re-elects LauBach of Houston as 1955 President

NEAL B. LAUBACH, manager of the Cooling Equipment Department of HUDSON ENGINEERING CORPORATION, HOUSTON, TEXAS, was re-elected President of the Cooling Tower Institute at its annual meeting in January. PAUL R. HOFFMANN of LILIE-HOFFMANN COOLING TOWERS, INC., ST. LOUIS, MO., was elected vice-president.

Neal LauBach

Extensive field research work is carried on in the Gulf Coast area by the CTI Field Service Department under the supervision of Chief Field Engineer JAMES L. WILLA, with headquarters in Houston, Texas. Studies of wood maintenance and thermal phenomena in cooling towers are financed by the member companies of CTI.

Fairbanks-Morse Award for New Orleans Branch

The NEW ORLEANS BRANCH of FAIRBANKS, MORSE & CO. received the silver trophy for top sales performance in 1954 in the sales contest conducted annually by this Chicago manufacturer of diesel engines, locomotives, scales, pumps and electric machinery. The Colonel Robert H. Morse Cup, as the silver trophy is called, was presented by Colonel Morse, chairman of the board, to P. S. PROCTER, manager of the Fairbanks-Morse New Orleans Branch at a dinner at the Roosevelt Hotel, New Orleans.

A gain of more than 20% over the previous year's sales in the New Orleans area was reported. Last year the Atlanta, Georgia, Branch won the trophy.

Amarillo Distributor for Parker Appliance

GENERAL SALES, INC., 110 West 4th Street, AMARILLO, TEXAS, has been franchised as a Parker tube fitting distributor, according to D. A. Cameron, industrial sales manager of The Parker Appliance Company, Cleveland, Ohio.

JOHN HARLEY, general manager of General Sales, announces his firm will carry Parker tube-working tools as well as a wide range of fittings for prompt servicing of the needs arising from the growing industry in the Texas panhandle.

The new distributor, for technical assistance as needed, will be served by JIM H. ATKINSON, Parker district manager with headquarters in Houston.

Will Holmes Joins Master Tank & Welding

WILL K. HOLMES has joined the sales staff of MASTER TANK & WELDING, Dallas, Texas, according to announcement by Sam O. Weempe, co-owner. Mr. Holmes will specialize in the sale of anhydrous ammonia equipment, including applicators, tank transports and storage tanks up to 30,000 gallon capacity.

He was formerly associated with Agricultural Chemical Equipment Company and traveled throughout the Midwest on sales of bulk storage plants, engineering service, safety equipment and fittings. Prior to this, Holmes had his own LPG dealership in western Tennessee, was in the sales department of the LPG division of Anchor Petroleum and spent 12 years with the Texas Company in the sales department.

Honan-Crane Changes Name

The name of HONAN-CRANE CORPORATION, Lebanon, Indiana, has been changed to HOUDAILLE-HERSHEY OF INDIANA, INC.

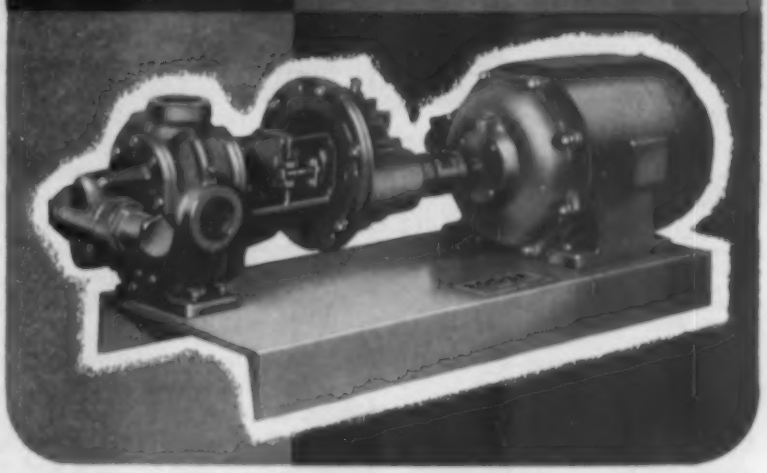
Honan-Crane has been operated as a subsidiary of Houdaille-Hershey Corporation for the past ten years and is one of the pioneers in the oil and coolant filtration fields. The name "Honan-Crane" will be retained to identify the new company's oil filter equipment.

QUALIFIES FOR THE JOB ON MANY COUNTS

ROPER

SERIES 3600

PUMP



If you have a job open for a pump, then by all means consider the Roper Series 3600 as the heart of your fuel transfer system. Designed to handle thin or thick liquids quickly and safely, these pumps offer you the many advantages of the rotary gear principle, plus a most important benefit — Roper *dependability*. There is a size for your needs, as models are available from 40 to 300 G.P.M. sizes — pressures to 60 P.S.I.

Check AND COMPARE THESE FEATURES

- √ **Compact** . . . requires minimum of installation space.
- √ **Indoors or Outdoors** . . . no pump house needed.
- √ **Gear Reduction** . . . totally enclosed and running in oil. Three gear ratios available.
- √ **Anti-Friction** bearings throughout gear reduction.
- √ **Steel Bed Plate** provides rigid foundation for pump and motor.
- √ **Operation** . . . unusually smooth and quiet; pump operates in either direction.
- √ **Suction Lift** . . . up to 15 feet at 60 P.S.I.
- √ **Helical Gears** . . . run in axial hydraulic balance. Pump fitted with 4 high-lead bronze bearings; split-type gland.

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GEO. D. ROPER CORPORATION
434 Blackhawk Park Ave.
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ROPER Rotary Pumps

"THIS LUBRICANT ENABLED US TO INCREASE PRODUCTION"

says—PITTSBURGH TUBE COMPANY

"Our 70,000 pound Draw Bench was designed to operate at a maximum of 80 feet per minute, full load. We decided to increase the drawing speed on lighter tubing to 100 and 104 feet per minute. This overloaded the Speed Reducer, however, causing it to overheat. We tried four different makes of oils without success before trying LUBRIPLATE A.P.G. 90. With LUBRIPLATE, we are able to pull heavier tubing than before at 104 feet per minute without the Reducer overheating."

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Maintenance Engineer

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LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

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$$$ For Your Ideas

See page 72

Painter's School

(*Starts page* 70)

the attendance record.

It was planned to award inscribed billfold cards and a certificate of accomplishment to men attending at least six of the eight meetings. These were donated by a contractor and were inscribed before the last meeting for all who had attended six or seven meetings. In addition a set was prepared for all who had attended five meetings, and those of this group who were present for their sixth (final of the school) meeting had their certificate waiting for them.

Those 102 painters who qualified for the above certificates also received mimeographed copies of most of the talks presented. Also included were a few commercial sheets, describing products sold by lecturers, especially those sheets that were general in nature.

There have been many favorable comments from the painters concerning the school and quite a few requests for another training program. We believe that the school, in addition to raising the level of the craftsmanship of those attending, has brought about a better understanding of the problems that confront people concerned with industrial painting, and has made for better working relationship.

Controlling Bacteria in Air-Wash Tank

(*Starts page* 66)

uses only 6 lb steam pressure for operation, so we connected the steam hose to a close-by source of higher pressure steam. The entire system of baffles can be cleaned and sterilized in approximately 15 minutes with this easy to handle device.

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BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
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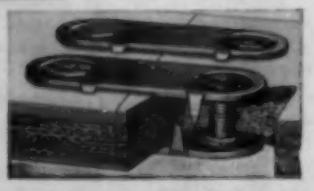
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



Compression Grip distributes strain over whole plate area

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FLEXIBLE STEEL LACING CO., 4625 Lexington St., Chicago 44, Ill.

Photograph No. 3 illustrates the clean condition of the baffles one week of operation after cleaning the dehumidifier baffles and spray tank with steam. Formerly we used from $.80 to $1.20 worth of chemicals daily in combating the bacteria. We flushed out the 1400 gallon tank an average of once every two weeks, or oftener when necessary. When the tank was refilled it was necessary to triple the dosage of chemicals, and the overall cost of chemicals was approximately $400 yearly.

Under the present arrangement we use no chemicals, and are not using any additional spillover to keep the water clear. The steam hose and valve arrangement cost us only $35.00. We are no longer troubled with the bacteria, the water in the air-wash remains clear of foreign matter and chemicals, and the conditioned air is free of the objectionable odor that once existed. We are well pleased with this system of controlling air-wash contamination in the air conditioner.

Electrical Maintenance at Dan River Mills

(*Starts page* 64)

Special consideration is given grounding and bonding. Our power distribution system is so large and complex that it was difficult and expensive to locate ground faults. In order to meet this problem, devices for detecting and locating grounds have been installed at 26 selected points of the distribution system.

The load on safety switches is now limited to 65 per cent of rating. In years past, when safety switches were used to the limit of their rating, trouble ensued. Fuse cases burned out, and often damage was caused to the switches themselves. Under our present limitation, fuse replacement cost has dropped from $20,000 to $3,000 per year.

Standardizing Equipment

We also try to simplify and standardize items of equipment. During the years of our company's growth, different types of devices

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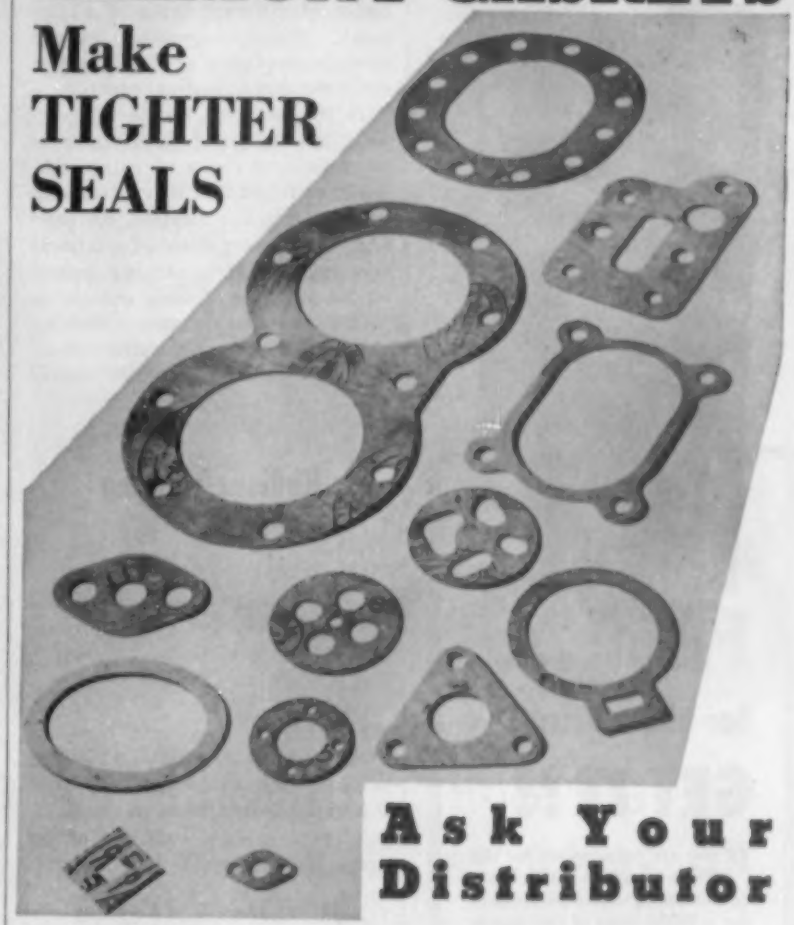
Make TIGHTER SEALS



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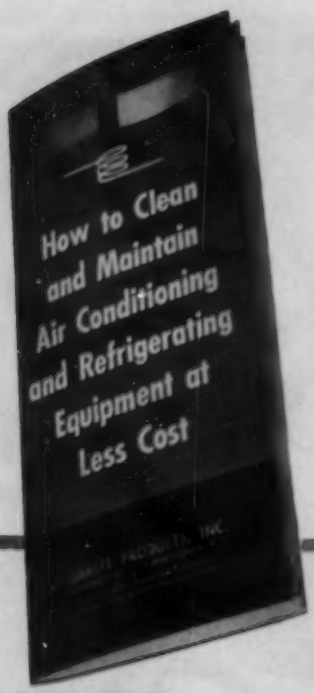

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for controlling speed have been introduced. This resulted in a hodgepodge of different types of equipment. Wherever possible, we are now standardizing so that identical machines have identical controls.

In the past, the textile industry used individual electrical controls on individual items of equipment. We have found that by centralizing controls into one location, we have eliminated many items of electrical equipment, thereby saving money on the purchase of these devices as well as on maintenance. Making electrical controls as automatic as possible has also simplified operation.

Radiant Heating

(*Starts page* 62)

This of course is because at the higher speeds it will be necessary to have a higher temperature for the shorter time during which the material is exposed to the heat. When the web of material does not extend across the full width of the machine the wiring is such that the unneeded portions of the heating units can be switched off in order to avoid waste of power.

Metal Sheathed Element

The third type of electrical infra-red heating unit has a heating coil inside of a metal tube and is known as the metal sheathed element. This type is not subject to as close temperature control as either the glass enclosed filament or open glow heaters because it holds heat longer after being switched off and is not as fast to heat up.

It is not always practicable to energize this type in sections, as explained for the open glow heaters, nor is it usually possible to incorporate the same automatic control features. These heaters are consequently likely to be less economical to operate. However there are numerous successful applications, but generally speaking the open glow type is more widely applicable.

Gas Radiant Heat

Radiant heat gas burners are in many respects similar to the open glow electrical units. A mixture of gas and air to give complete combustion with practically no flame burns over a refractory surface which is heated to incandescence.

These burners come in small sections which can be assembled into the desired length. They can also be provided with automatic controls for maintaining the temperature at the desired point, as well as to make it impossible to ignite the burners without thorough purging and to guard against the accumulation of unburned gas. It is also possible to provide for the automatic turning off of the gas in case of ignition failure and to interlock all controls so that the burners are shut off when the machine stops.

The temperature of the refractories can be as high as 2600 F at full capacity, but the burners may be throttled down to 10% of rating without disturbing the correctly proportioned mixture of gas and

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SIGHT FLOW INDICATORS

"See What Goes On Inside"

For insertion into pipe

FOR EVERY APPLICATION

BRONZE, IRON, STEEL, STAINLESS STEEL

FIG. 29
Cylinder with Impeller

FIG. 17-28
Cylinder

FIG. 215
Flanged

FIG. E-57
Double Window

FIG. 212
Visibility Welding Neck or Screw

FIG. E-811
Flapper

FIG. E-1810
Rotating Wheel Type

All sizes up to 6"

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air for complete combustion. Of course the distance of the material from the incandescent surface determines the rate of drying, and experience has shown that a decrease of 33% in distance increases the efficiency 45%.

This type of radiant heater is used quite widely in the textile and paper industries and has the advantage of low cost operation, especially in regions where natural gas is available.

In the textile industry gas heaters are used in front of calendars, under tenter frames, in drying boxes and in connection with piece dyeing of various synthetics and for curing operations of natural fibers, among other things.

In the paper industry they are frequently located at the wet end of paper machines, often between the last press roll and first dryer, and help to speed up this operation. They are also used to dry coatings on paper board, etc. between the coat and first dryer so that sticking will be reduced or eliminated. They are also placed outside of calendars to maintain the rolls at the desired temperature.

The burners may be placed horizontally, vertically or upside down, on one or both sides of the material, whichever will give the best results under the conditions. In fact the types of application are limited chiefly by the ingenuity of the man applying the equipment.

From the foregoing it will be seen that infra-red heating has many important advantages but, as one of the foremost manufacturers of this type of equipment points out, it is not magic.

The right type of heater must be selected, it must be properly installed and at the right point in the process; and of course there are conditions where infra-red radiant heating is not the thing to use in any event.

A plant engineer or other executive who is considering the installation of infra-red heating should seek the advice of one or more of the reliable manufacturers of infra-red equipment and get the benefit of the experience, which is available for the asking. A reliable manufacturer will not recommend the use of his product if he does not think that it will be satisfactory, as failures provide a poor background for future sales.

Portable Power Plant

(*Starts page* 61)

eliminated by having a central water treating and power plant and moving the mine heaters to the wells with the relay stations. In this way only treated water, gas and air will be piped overland to the relay stations.

Corrosion Reduced

The ever present problem of corrosion, scaling and idle standby equipment has been significantly reduced in Standard's operations. The plant was operated on an emergency basis for two weeks without steam or treated water. Also, with

Large structure is an Armco Series P Building. At right is an Armco Series S Building.

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Chances are, your requirements can be met with Armco Steel Buildings. There are two different styles—Series S and Series P—offering clear-span widths from 4 to 100 feet. Multiple-Span Structures will supply practically any widths. Lengths are almost unlimited.

SERIES S BUILDINGS have unique STEELOX construction that simplifies erection even for small crews without previous erection experience. Widths range up to 40 feet.

SERIES P BUILDINGS have a steel framework covered by corrugated metal sheets. Widths range from 30 to 100 feet.

Both structures are of durable, all-metal construction. They have been used for a quarter of a century in various industrial and commercial applications. With either type, the structure may be extended or dismantled and re-erected without loss of material. Send coupon for details.

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With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

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minor adjustments, it operates with over 6,000 parts per million of sodium chloride in the raw water without introducing serious scaling problems.

There is no standby equipment other than dual pumping units and dual electric generators. When maintenance is required, the plant is flexible enough to operate at reduced capacities until the maintenance work is completed. This constitutes a minimum of idle investment for standby equipment.

Economy

By far, the most important feature of this design is the economy of operation and low investment, when compared to the previous sulphur mining operations. Standard's plant produced 500,000 gallons per day of water at a controlled pressure of from 150 psig to 300 psig and at controlled temperatures of from 300 F to 400 F.

The facilities described were installed for approximately $350,000 and the plant capacity can be doubled for additional expenditure of approximately $200,000. In other words, the cost of this plant was less than half of comparable existing installations. Even though the thermal efficiency, due to the use of portable equipment, is not as good as a permanent installation, its compactness, simplicity and flexibility can more than offset the cost of increased fuel consumption.

H. E. Bovay, Jr., Consulting Engineers are preparing a design of this type to be used to recover sulphur from deposits beneath the sea in the off shore tidelands. This design is tailor made for use on a mobile type off shore platform.

Alabama Power's Barry Plant

(*Starts page 50*)

condenser room and set into the intake tunnel supply all service water for the plant. The discharge lines from these pumps serve as suction headers for high pressure pumps which feed independent systems for ash sluicing, screen washing, cooling, and miscellaneous house service water.

Each of these systems is fed from both suction headers so that some pump capacity will be available in the event of loss of one of the priming pumps. In addition, a by-pass is provided to supply both headers from the condenser circulating water pumps. The cooling water system supplies water for generator, turbine oil, and transformer oil cooling and is backed-up by the house service system through a pressure controlled cross-over.

Coal Handling System

Coal received by barge is unloaded into a 450 ton unloading hopper and fed to the belt conveyor system by a 850 tons per hour plate feeder. Coal received by rail is unloaded into a 500 ton track hopper and is fed to the belt conveyor system by six 350 tons per hour vibrating feeders.

The vibrating feeders are regulated by an automatic weightometer control which loads the belt at the rate of 850 tons per hour. Two vibrating car shake-outs are provided

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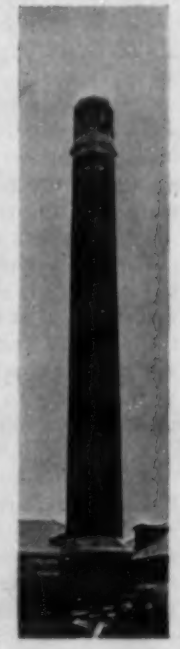


to facilitate unloading the coal from cars.

Coal is conveyed and elevated from the barge hopper and the track hopper to a building which houses two 475 tons per hour ring type crushers for reducing all coal to minus one inch. This building also houses transfer points which allow routing the coal to the boiler room bunkers or to storage.

Self-propelled shuttle conveyors distribute the coal in the boiler room bunkers which are located above the pulverizers. Coal is distributed over the coal storage area, and reclaimed from storage, by the use of bulldozers and tractor drawn, scraper type carryalls. All coal is crushed before being placed in storage and is compacted under tractor traffic.

Generator Buses

The indoor section of each generator bus is 6" x 6" x 3/8" ventilated copper tubing. The outdoor bus section is comprised of two 7"-15.45# copper channels turned flange to flange. The indoor and outdoor sections of bus are connected at the building wall through 25 kv, 6000 ampere wall bushings. The bus is insulated throughout by 23 kv post type insulators.

Due to the magnitude of currents carried by these buses, it was necessary to take certain precautions to prevent excessive heating of steel near the bus. These precautions included low resistance shielding loops around supporting steel members perpendicular to the bus, insulation between adjacent supporting steel members which formed complete electrical loops, and insulation between reinforcing rods at cross points in the generator foundation.

The generator neutral bushings are interconnected with a 6" x 6" x 1/2" copper tube bus. The generator is grounded through a distribution type transformer having a capacity suitable for continuous operation under fault conditions.

Transformers

The generator voltage of each unit is stepped up to transmission voltage through a three phase, 18,000 volts delta to 115,000 volts wye, 160,000 kva forced oil-water cooled transformer. Each transformer has reduced voltage insulation on the high voltage windings, and is protected by 97 kv lightning arresters.

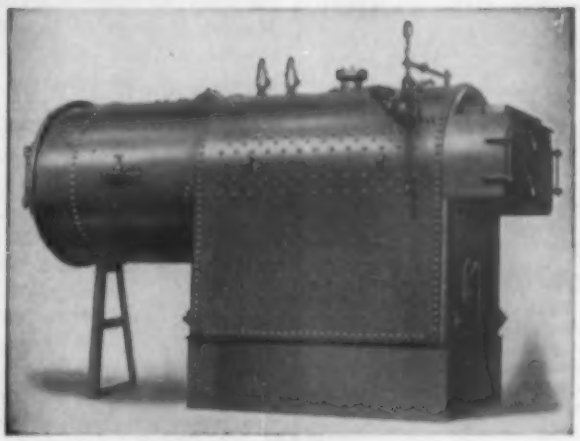
The main station service power is supplied at 4160 volts from individual transformers connected to the two generator buses. Additional step-down transformers reduce this voltage further for the smaller auxiliaries.

Since the generators are directly connected to the main step-up transformers, a 115,000/4160 volt station service transformer is provided for starting either unit.

Station Service

In general, all motors rated above 200 hp are supplied from the 4160 volt station service system. All motors from the 5 hp to 200 hp are supplied from the 575 volt station

POWER
with POWER *to spare*



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This boiler is in addition to our regular line of single pass fire box boilers which we have been making since 1918.

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Barry Plant (continued)

service system and all motors less than 5 hp from the 208 volt station service system.

All 4160 volt station service switchgear is of the standard Metal-Clad design having fully insulated buses and connections throughout. Supply air circuit breakers are rated 2000 amperes and the feeder circuit breakers 1200 amperes. All breakers have an interrupting rating of 250,000 kva at 4160 volts. One switchgear group, of twenty-two compartments, is provided for each generating unit.

All 600 volt station service switchgear is of the Metal-Clad type. The design deviates from standard in that a "Clearance" position is provided in addition to the normal "Test" and "Connected" positions of the breakers. In the "Clearance" position, both primary and control separable contacts are disconnected. The breakers can be locked in this position and the compartment doors closed.

One 600 volt switchgear group is provided for each unit. An essential group supplies auxiliaries which are common to both units. Supply air circuit breakers are rated 2500 amperes, bus tie breakers—1600 amperes, and the feeder breakers—600 amperes. Short circuit currents have been limited to less than 25,000 amperes which is the interrupting rating of the feeder breakers.

The coal handling switchgear is a Metal-Clad 667 kva, 4160/600 volt unit substation. This switchgear is supplied by a feeder from each of the main 4160 volt switchgear units. The coal crushers and barge unloader are supplied at 4160 volts. Conveyor motors and other smaller loads are supplied at 600 volts. A control section is built into this switchgear which enables setting up sequential operation of the breakers for any of the coal handling schemes. Master control switches, one for each operation, are located on the control section.

A 150 kw, 600 volt gasoline engine driven generator provides emergency power for certain essential station auxiliaries in the event of complete loss of generation and isolation of plant from the system. The generator is connected to the 575 volt essential bus.

Interlocks are provided to prevent closing the generator breaker while the essential bus is connected to one of the main 575 volt station service buses. A load stripping scheme removes all load from the essential bus except the battery charging M-G set; one building sump pump; and an emergency 600/120-208 volt transformer which supplies emergency lights, combustion control and communication equipment.

After the engine driven generator is connected to the essential bus certain other essential auxiliary loads such as, turning gear motor, turning gear oil pump, and hydrogen seal oil equipment are added.

Motors

In general, all motors in the powerhouse are of the open, drip-

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proof construction with Class A boiler room insulation.

The induced draft fan motors, being outdoors, are of the water-cooled type with Class A insulation. Other outdoor motors are of the totally enclosed type with Class B insulation.

All coal handling motors are totally enclosed with Class A insulation for operation in Class II, Group F atmospheres.

Cables and Connectors

Okolite insulated, Okoprene jacketed cable has been used throughout the plant, on station service power and control circuits, where ambient temperatures do not exceed 45 C. Okotherm insulated cable with glass braid covering has been used on all control circuits and lighting circuits where ambient temperatures exceed 45 C.

In general, all cables, size #2/0 and larger, are stranded aluminum. The aluminum cable terminals are compression type tinned aluminum connectors. The connector barrels are filled with a compound (Pentrox "A 5") which serves to seal the joint between connector and cable against oxidation. The compound also penetrates any oxide film which may be present.

All connections involving aluminum connectors are made with Everdur bolts, Belleville spring washers and Columbia self-retaining nuts. Where only copper connections are involved, Everdur bolts, nuts and lockwashers are used.

Substation

The 115 kv substation is of the one and one-half breaker design employing, at present, sixteen 5000 Mva, 1200 amp oil circuit breakers. These breakers control switching of two generators, six 115 kv lines, and one starting station service transformer.

The main 115 kv buses are of the rigid type comprised of two 6"-4.63# aluminum channels turned flange to flange and welded together. The bus supports are on 40'-0" centers. All connections to the buses are made with welded type connectors for aluminum tubing.

An air conditioned brick switch house with full basement is provided to house the substation switchboard, station battery, and oil purifier equipment.

The switchboard utilizes a bench type control board and a vertical board for relays and instruments. The metering, control equipment, and protective relaying for all 115 kv lines, and the starting station service transformer are installed on the boards.

A recording instrument panel is also provided to record current, megawatts and megavars on all 115 kv lines.

Fire Protection

Full fire protection has been provided in this plant, i.e.—water fog for oil and general fires, fixed carbon dioxide systems for 4160 volt and 600 volt switchgear, portable carbon dioxide and chlorobromomethane units for first aid. The backbone of protection is the high pressure water fog system.

Main power and station service transformers are protected by remote-controlled deluge type fog tips. Relatively few fog tips are required for this method of fog application. Piping is much simpler than in systems employing a multiplicity of small capacity fog heads.

Indoor oil reservoirs, oil tanks, oil handling equipment and hydrogen equipment are protected by remote-controlled fog head systems. Danger points in the coal handling system, such as crusher house, conveyor transfer points, etc., are also protected by means of remote-controlled fog head systems.

Two high pressure pumps, one gasoline engine driven and one motor driven, supply the water fog system. A 150,000 gallon water tank is used to store well water for the system.

Commercial operation of Unit #1 began on February 11, 1954, and that of Unit #2 on June 20, 1954. Final tests have indicated that the expected plant heat rate has been fully realized.

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and others
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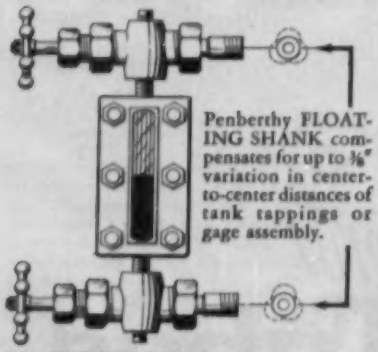

Penberthy FLOATING SHANK compensates for up to ⅛" variation in center-to-center distances of tank tappings or gage assembly.

The FLOATING SHANK principle is a patented feature available only on Penberthy Gage Valves and at no extra cost. Ask your supplier to furnish these valves for *all* your gage requirements — new installations and replacements. Use the coupon to obtain detailed information on the Penberthy line of Liquid Level Gages and Gage Valves.

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WHAT'S NEW and Where to Get It

FOR FREE INFORMATION—Circle code number on page 17 or 18

P-1 **ALL-PURPOSE WELDER**—Catalog 1343, 8 pages—Describes "Idealarc" all-purpose welding machine which permits selection of either a-c or d-c and either a soft or forceful arc. For a-c welding jobs machine provides a single phase transformer type welder; for d-c welding machine provides d-c current through heavy duty rectifiers.—THE LINCOLN ELECTRIC COMPANY, P. O. Box 2115, Cleveland 17, Ohio.

P-2 **SAFETY EQUIPMENT**—Catalog No. 54A, 28 pages—Illustrates and describes protective equipment. Includes chemical reference charts, glove selector guide, and information on use and care of all-neoprene, synthetic, and natural rubber safety gloves for industrial use.—CHARLESTON RUBBER COMPANY, Stark Industrial Park, Charleston, S. C.

P-3 **BLOW-OFF UNIT**—Bulletin No. 152, 4 pages—Describes the "Uniblow" rotary disc continuous blow-off unit, featuring economy in fuel and water, uniform concentrations in boiler water, elimination of wet steam and carry-over, wide range blow-off with 15 orifices, and other advantages. Illustrated with photograph and line drawings.—THE UNIBLOW VALVE COMPANY, 1920 W. 77th St., Cleveland 2, Ohio.

P-4 **UNDERFEED STOKERS**—Bulletin SB53, 12 pages—Cut-away sections and detailed parts show the construction of Fluid Ram and Gear Drive Single Retort Underfeed Stokers designed to handle loads of 100 to 500 developed horsepower.—ERIE CITY IRON WORKS, Erie, Pa.

P-5 **PIPE CONNECTIONS** — GRALOC Catalog, 12 pages—Describes new line of universal pipe connections, unions, and bleeder valves, and discusses all-steel sealing with a pressure-aided seat, called the "Gralloc" principle. Data is given on construction, operation, specifications, applications, and prices.—GRAY TOOL COMPANY, P. O. Box 2291 (K48), Houston 1, Texas.

P-6 **ALKYD MILL WHITE**—Bulletin, 4 pages — Describes a new mill white, made with an alkyd vehicle and featuring quick-drying, durable qualities. Photographs show plant applications for trim, dadoes, stair-risers, and machinery.—THE ARCO COMPANY, 7301 Bessemer Ave., Cleveland 27, Ohio.

P-7 **ROTARY PUMPS**—Catalog 955, 8 pages — Shows complete line of standard Roper pump products, with new additions and improved features. Photographs and drawings illustrate models available; and dimensions, capacities, materials of construction and other pertinent facts are included.—GEO. D. ROPER CORPORATION, Rockford, Ill.

P-8 **UTILITY POWER PIPING**—Booklet, 12 pages—Describes specific services and facilities offered to the utility power piping field, including methods of stress analysis, metallurgical research, new welding methods, and special heat treating techniques. Gives step-by-step picture story of new welding method for power piping.—THE M. W. KELLOGG COMPANY, Fabricated Products Division, 225 Broadway, New York 7, N. Y.

P-9 **VALVES** — Form 5417, 4 pages — Shows a complete line of precision controlled valves for high and low pressures and wide ranges of temperature. Explains how steam, water, gas, oil, and viscous fluids of all kinds can be handled accurately with the same valve design by a change of pilot valves to provide a wide application.—C. E. SQUIRES COMPANY, 15502 Syracuse Ave., Cleveland 10, Ohio.

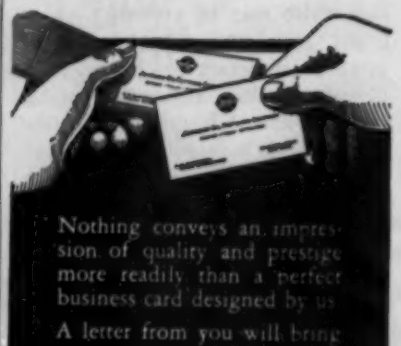
P-10 **BOILERS** — Bulletin No. 542, 6 pages—Explains how Brown finned tubes, applied to boilers for the first time, bring new efficiencies to steam generation. "Fintube" boilers are illustrated with photographs showing plant applications, equipment, and components.—BROWN FINTUBE COMPANY, Elyria, Ohio.

P-11 **FOUNDATION PIPE**—Bulletin 542, 8 pages—Describes foundation pipe for piling and illustrates its application in construction with actual photographs of pile driving logs. Lists pipe sizes.—TAYLOR FORGE & PIPE WORKS, P. O. Box 485, Chicago 90, Ill.

P-12 **TROLLEY BUSWAY ELECTRIFICATION**—Bulletin No. 44, 4 pages—Tells how to have safe electrification for cranes and hoists; details advantages of Feedrail system of enclosed trolley busway electrification; explains what it is and what it does. Plant applications are illustrated.—FEEDRAIL CORPORATION, 125 Barclay St., New York 7, N. Y.

P-13 **MOTOR CONTROLS**—Booklet No. 5411, 48 pages—Pocket catalog for electric motor controls contains photographs, specifications, and prices for magnetic starters and contactors, push buttons, combination starters, drum controllers, master, foot, limit and pressure switches. — FURNAS ELECTRIC COMPANY, 1047 McKee St., Batavia, Ill.

P-14 **BOILER REFRACTORIES**—Bulletin R-36, 20 pages—Guide for selecting the most efficient and economical boiler refractories; discusses basic requirements to avoid chief causes of refractory failure.



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P-15 **PLASTIC PIPE**—Catalog, 12 pages—Tells how to use and specify rigid plastic pipe and fittings. Properties and characteristics are covered, with detailed drawings and specifications of solvent-type fittings plus the new injection-molded threaded fittings. Corrosion chart and applications are included.—ALPHA PLASTICS, INC., 14 Northfield Road, West Orange, N. J.

P-16 **FORGED STEEL UNIONS**—Bulletin U-1, 4 pages—Describes new forged steel unions of highest quality carbon steel. Presents complete dimensions in sizes ⅛" to 2" in 3,000 lb class, and gives outstanding design features which make the unions desirable for high pressure service and for resistance to shock, vibration and misalignment stresses.—WATSON-STILLMAN FITTINGS DIVISION, H. K. PORTER COMPANY, INC., 342 Madison Ave., New York 17, N. Y.

P-17 **SUPER REFRACTORIES**—Form No. 5056, 24 pages—Gives latest physical and chemical properties of super refractories by Carborundum. Data assembled in easy to find style, augmented by lists of applications, charts, and tables.—THE CARBORUNDUM COMPANY, Refractories Division, Perth Amboy, N. J.

P-18 **FURNACES AND BOILERS**—Catalog—Features unit suspended walls and arches for industrial furnaces. Emphasis is on latest designs, the results of modern application trends in all types of industry. Illustrated.—BIGELOW-LIPTAK CORPORATION, 3550 W. Grand Blvd., Detroit 8, Mich.

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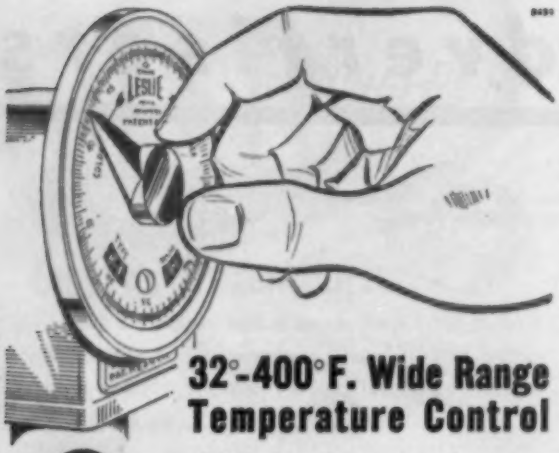

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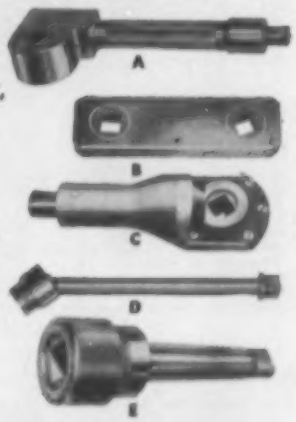

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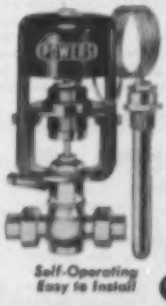

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There's no contest to enter! Nothing to write! Between April 1st and November 1st, 1955, five weldors will find a special "Gold" rod or electrode in their shipments of new, 1955 Eutectic "Low Temperature Welding Alloys." One represents the 1 billionth "rod" produced by Eutectic during its first fifteen years. The weldor who returns it to his Eutectic District Engineer will receive a $100 award.

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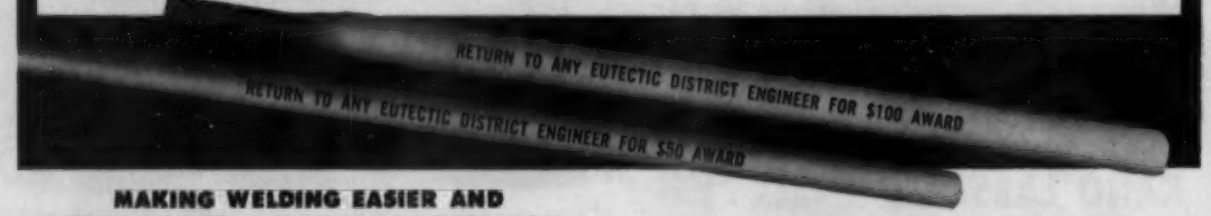
It's as simple as that. Just be on the watch for a "Gold" rod in your shipments of EutecRods and EutecTrodes.



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15 years of relentless research have helped Eutectic "Low Temperature Welding Alloys" gain the preference of a rapidly increasing number of weldors in 87,000 American industries. Each year, Eutectic research has introduced new products for "Better, Faster, Cheaper" welding. Now, a new "15th Anniversary" laboratory in Flushing, N. Y., and additional research centers in Europe will assure continued advances in the fight against an important cause of weld failure: HIGH HEAT!

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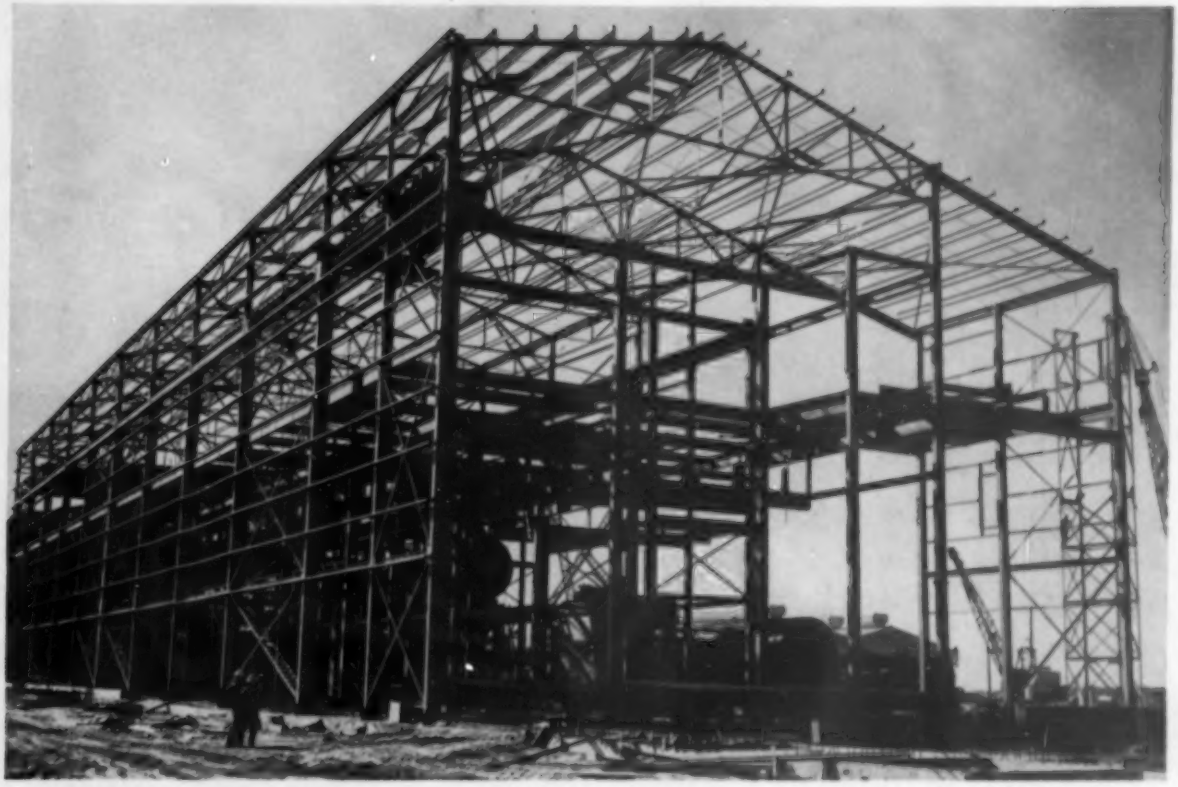

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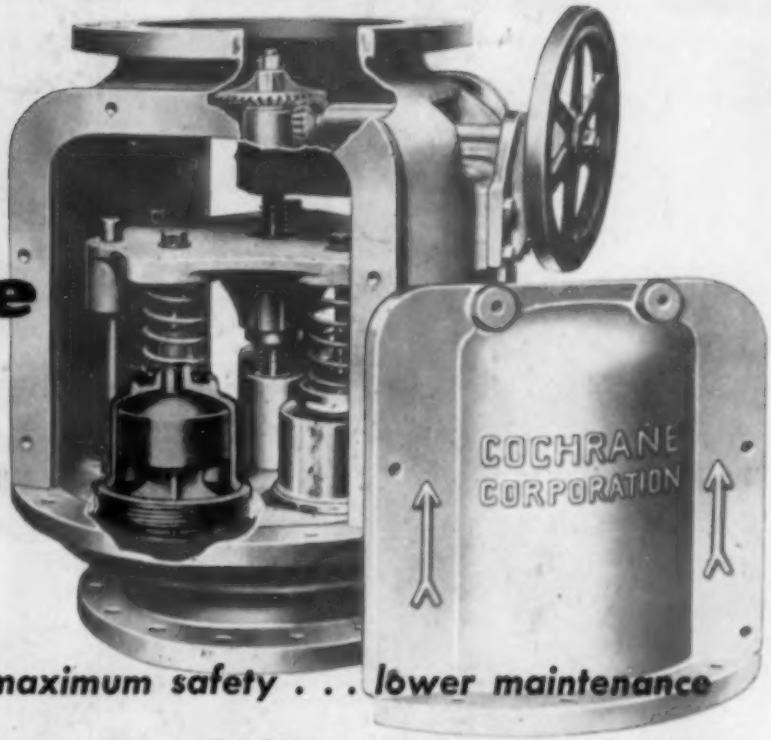

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dependability . . . maximum safety . . . lower maintenance

Cochrane Multiport Valves guarantee uniform regulation of line over-pressure with maximum safety. The use of multiple *vapor cushioned* discs, made of corrosion-resistant metals, prevents possible valve failures. Valves will not rust, freeze or jam. Valves operate automatically and positively.

As set pressure is exceeded, the *vapor cushioned* valve discs ride open gradually with the over-pressure . . . eliminates heavy pulsations in the line that would be transmitted to heater and other equipment. When only the *exact amount* of over-pressure is bled off, valve discs close gradually and *gently* to pre-set pressure, eliminating back surge, blowdown or vapor hammer.

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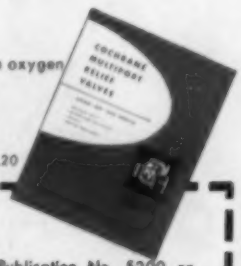

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